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GARBAGE

THE INDEPENDENT ENVIRONMENTAL QUARTERLY
FALL 1994

the environmental movement, from edward abbey's stirring iconoclasm to the moans of 'backlash'...

what next?

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FROM THE EDITOR PATRICIA POORE

Do We Forget Why?

MAYBE IT WAS THE ARRIVAL OF Ed Abbey's journals: literary satisfaction amidst the scientific papers and propaganda. Maybe it was excitement over Bill Breen's fishing trip to Alaska, where, with his father and brothers, he made camp in the heartbreaking wilderness. Maybe it was my obsessive digging in the dirt as I reclaim the landscape around my old house. Or maybe, as Gloucester faced the tragedy of another fishing boat lost, it was recognition of the power of an unforecast ocean gale.

Whatever it was, as autumn took hold, something brought old feelings into this office — love and awe for that universal connectedness with the planet. I found myself wondering about how remote those feelings are from the practice of "environmentalism."

SURELY, THE ENVIRONMENTALISM OF THE PAST TWO centuries has been a sign of progress for humanity, evidenced by two overriding concerns: conservation and aesthetic awareness. Concern for conservation is an indication of an evolved interest in the future, an exclusively human trait. Environmentalism as a recognition of beauty and intrinsic worth, too, indicates evolution of the human spirit.

And it has been an indication of affluence, for only in good times do we have the opportunity to consider the future and beauty. For all of these reasons, environmentalism has been an elitest pursuit, the province of those whose lives had moved out of chaos and whose souls searched for value beyond daily existence. Why, I wonder, are today's environmentalists so anxious to counter labels of elitism? Theirs is (or it was) an excellent elitism, a superior view to which anyone could aspire, based not on birthright or wealth or caste, but on an aesthetic, a way of seeing the world. And where would we be as a species if individuals had not aspired to a loftier view than that of the mean and common?

AT SOME POINT, THE IDEAS BECAME A "MOVEMENT" AND THE movement got bogged down in bureaucracy, politics, and the ordinary — probably in a well-intentioned effort to include the common man. Ironically, the further into the field I venture, the more I see "environmental concern" as an ill-defined jumble of topics which stresses such unexalted pursuits as micro-regulation by committee and recycling trash. Like the public (I suppose), I rarely derive unexpected inspiration from the personal view of an Edward Abbey anymore. The unrelenting flood of humorless words tells me instead that environmentalism has become a religion of shalt nots.

I am unhappy to find the rank-and-file movement at war with scientists, who should be allies or at least fellows in their pursuit of human excellence. I find too little aspiration, and too much arrest. The prosaic and often negative focus seems to me not merely inappropriate. It has trivialized the environmental movement and its human values. Why is anyone surprised at apathy and backlash in an arena where the love is gone?

GARBAGE has suggested, for example, that management of municipal solid waste is more reliably handled by sanitation engineers than by professional environmentalists. There is an even bigger reason to rethink priorities. If environmentalists insist on aligning themselves with the mundane, environmentalism will be accorded the same stature as garbage collection. Whence, then, the inspiration to evolve?

BRYAN L. PETERSON

TABLE OF CONTENTS

FALL 1994 VOL. VI, NO. 3

FEATURES

17 **AT ISSUE** *A pointed summary of our feature articles.*

out there

20 Confessions of a Barbarian

The late Edward Abbey has been called "the spiritual father of the environmental movement." This excerpt from his journals separates the man from the legend, revealing his deeply conflicted attitude towards deep environmentalism.

BY EDWARD ABBEY

values

28 What the Hell Are We Fighting For?

Crying "backlash," an embattled environmental movement struggles to articulate a vision of sustainable environmentalism for the future.

BY ROBERT BRAILE

public record

36 The View from the Citadel

Vilified by his enemies and even enviromentalists — his putative friends — Interior Secretary Bruce Babbitt is forging a new kind of pragmatic environmentalism. Perhaps the heat he takes from both sides is a sign that he's on the right track.

BY BILL GIFFORD

the real world

42 Once and Future Farming

Environmentalists who want to preserve wildlands from the farmer's plow as we feed a burgeoning human population should reconsider an old enemy: chemical-based agriculture.

BY RONALD BAILEY

counterpoint

49 We've Been Down that Road Before

It's time to hop off the pesticide treadmill and employ agricultural techniques that account for the long-term health of the soil and its stewards.

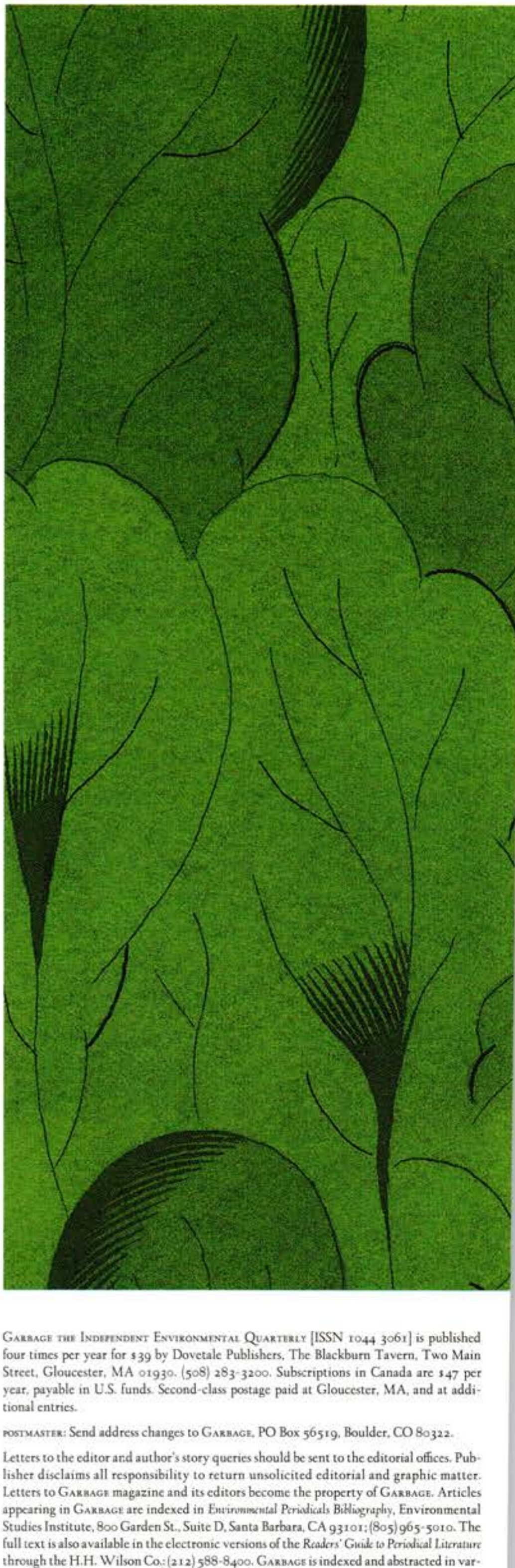
BY PAUL FAETH

doing it

52 Germ Warfare

Some vendors claim their toxicant-munching microbes can destroy a vast array of pollutants. Is bioremediation just a marketing scam, or a promising cure for future industrial cleanup?

BY JACQUELINE A. MACDONALD



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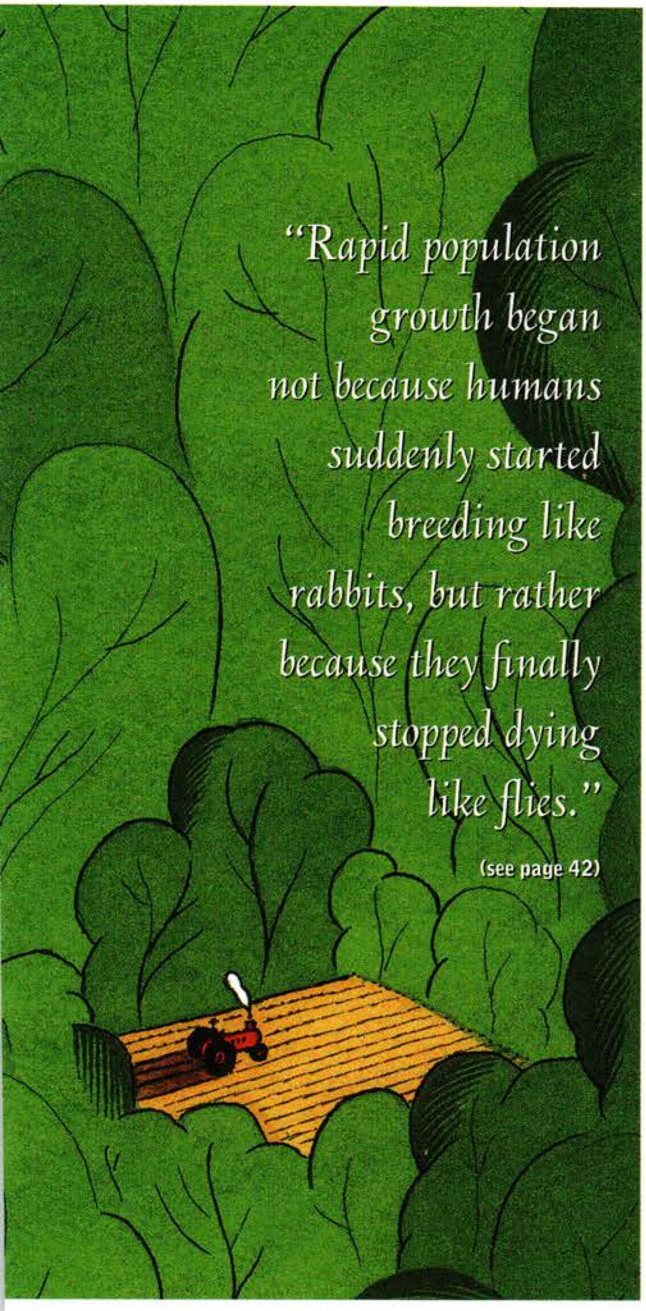

> "Rapid population growth began not because humans suddenly started breeding like rabbits, but rather because they finally stopped dying like flies."
>
> (see page 42)

UPFRONT

Peace of Mind Pollution? 10

A California EPA *report suggests that public desires should be considered along with scientific data when assessing ecological risk.*

Have Trash, Will Travel 14

A Supreme Court ruling leaves garbage pros wondering whether their plans for controlling the flow of waste must be scrapped.

Also: *Top environmental trends, the high cost of pollution control, and other news briefs and article updates.*

COLUMNS

From the Editor 3

In passion there is soul, persuasion, and strength. But who could be passionate about today's "environmental" issues?

Letters to the Editor 6

PETA *and The Nature Conservancy correspond; comments re: chlorine; milk and hormones.*

Soapbox 58

Discounting industry-funded research and relying on intuitive assumptions is bad science.

BY STEVE TROMBULAK

Recommended 60

A review of useful, computer-aided research resources available on the Internet.

BY DAN KENNEDY

Restoration 62

Researchers at an Iowa wildlife refuge attempt to rebuild a tallgrass prairie.

BY PAULINE M. DROBNEY

Ask Garbage 64

How to save gas while driving; the debate on pesticides sprayed on international flights; the impact of printing on clay-coated magazine paper.

In the Dumpster 66

Breaking its pledge to Congress, the Nuclear Regulatory Commission relaxes its inspections to keep bogus parts out of nuclear power plants.

BY BILL BREEN

also

The Garbage Dictionary 68

Join "Hikers Against Doo Doo" in the battle to keep trails feces free.

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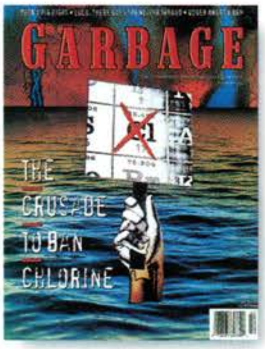
ON THE COVERS: *Cover photo by Fredrik Broden. Back cover illustration by Matt Foster.*

PETA Flared By Snare Article

SUMMER 1994

YOUR ARTICLE ABOUT PETA'S AND MANY other caring people's efforts to end The Nature Conservancy's (TNC's) use of grotesquely cruel wire neck snares to kill animals in Hawaii was a travesty of "journalism" (Bill Breen, "PETA's Pig Fight"). The "opinion" heading disguises prejudice and a lack of research, showing utter disregard for the truth in a matter involving the worst suffering imaginable.



It is untrue that PETA has instituted "a national boycott against [TNC's] corporate sponsors." Nor does PETA "loathe" TNC — or anyone else. We have done as TNC, GARBAGE, and anyone familiar with our work might have predicted: We continued to advocate for the animals despite TNC's arrogant "no" to our repeated request to remove cruel snares.

Your article misrepresented PETA's response to TNC's animal snaring as simply "Let the pigs be" (and deer and goats are also victims of TNC's snares). Letting them be is obviously more ethical than snaring them, but PETA repeatedly sent TNC detailed information about animal control methods and experts. TNC did not ever reply.

To say TNC "has sought the counsel of humane organizations, including PETA," would be laughable if it weren't pathetic. For years, the Hawaiian Humane Society, Animal Rights Hawaii, and others opposed TNC's snaring.

The article's statement that "[L]uminaries from the Sierra Club, the Rainforest Action Network, the National Audubon Society, the Earth Island Institute, and Defenders of Wildlife have written to PETA to call off the attack" is an outrage. We disagreed with those organizations about our protest against The Nature Company, and when we explained our reasoning, not one of those organization refuted our arguments.

Calling the effort to end snaring a "hate campaign" ignores two key facts: the snaring itself is part of a hate campaign — TNC wrote about the animals as "alien pests" without informing its supporters and prospective supporters of its inhumane way of controlling them; and PETA repeatedly urged TNC to remove its snares and recommended more humane alternatives *before* publicizing the problem, in the hope of averting a campaign.

GARBAGE should not be so quick to assume that those it labels "conservationists" or "environmentalists" are acting appropriately and that those who disagree with them are wrong. Conservationists like TNC have as much an obligation as anyone else to treat animals humanely, "crisis" situation or not.

—DAVID CANTOR
Senior Researcher, People for the Ethical Treatment of Animals
Washington, D.C.

The Nature Conservancy Replies:
As usual, Mr. Cantor avoids any mention of the suffering being inflicted on Hawaii's native species by displaced feral pigs. He doubts that an extinction crisis exists, despite the fact that half of Hawaii's native bird species have become extinct since the livestock invasion began. Extinction is not a painless process.

Nor does Cantor mention that the "humane alternatives" PETA demands are either already being used by the Conservancy, do not exist (in the case of pig contraceptives), or are not yet adaptable to the unique conditions in Hawaii. Many of PETA's naive suggestions — like sending in an army of volunteers to chase the pigs out of the rainforest — show no understanding of the ecosystem and would likely pose an even greater threat to the forest's endangered animals and plant species.

Cantor falsely assumes that those who fail to respond to his constant, voluminous diatribes must have acquiesced to his point of view. Not so. Many simply seek to avoid being used in unethical ways. As the president of one of the country's leading humane organizations wrote to us after being exploited by PETA on this issue: "I am sorry I ever answered the letter from PETA; [my words] are being used out of context, and being badly misused . . . I [wouldn't write] to PETA again under any conditions. I wouldn't write to tell them their pants were on fire!"

—RON GEATZ
Director, Field Communications
The Nature Conservancy
Arlington, Virginia

Comments About Chlorine

SUMMER 1994

THANK YOU FOR PUBLISHING THE DEFINITIVE and balanced article on chlorine by Ivan Amato (Summer 1994).

As implied in the accompanying chart, [titled] Sodium Hydroxide Chemistry and Products, the chlorine problem is only half the story. Chlorine and sodium hydroxide are not so much "fraternal twins" as Siamese twins. Assuming that "no one is calling for a ban of sodium hydroxide," the alternative to the electrolytic process that produces the "twins" is the Solvay process, where the chlorine in the raw materials (salt) ends up as a slurry of calcium chloride. Ask the opinion of folks who live around the old Solvay plants!

A follow-up article is needed on how the chlorine-free advocates propose to deal with that enigma.

As you point out, the problems of our interaction with the environment are complex, requiring careful analysis for their solution, not "from the hip" shooting on one side or the other.

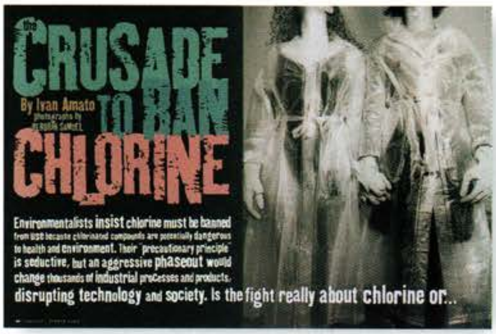
— Dr. John M. Blocher Jr.
Oxford, Ohio

I WAS VERY DISAPPOINTED TO READ your inaccurate and misleading article about the dispute over the industrial use of chlorine. Your writer sets up his straw man in his fifth paragraph, when he allows Greenpeace to stand as the voice of the environmental community.

Nothing could be further from the truth. Neither the International Joint Commission, nor any major environmental group I know of other than Greenpeace, favors the proposal of an immediate, total ban on all chlorine use.

Many environmental groups and the IJC do favor a "sunsetting" of chlorine: phasing it out of non-essential use and actively seeking acceptable replacements in those uses deemed essential — such as water purification and the manufacture of pharmaceuticals.

What difference does this correction in your basic premise make to the issue? Let's take a look at a major argument put forth by industry: that the switch from chlorine will wreak economic havoc on the nation. A report prepared for the Chlorine Institute by Charles River Associates, Inc., estimates that an immediate ban on chlorine would involve a yearly cost to the economy of $102 billion plus an initial conversion cost of approximately $67 billion. However, if you [deduct] the project expenses for changing water purification and pharmaceuticals, the figures are cut by almost 50%. These two categories together account for less than 5% of chlorine use by volume. [Add in] the jobs gained in industries replacing chlorine use, the lowered cost of environmental clean-ups and human health problems, as well as a number of other areas not considered in the Charles River report, and the economic bogeyman suddenly looks more like a paper tiger.



The CRUSADE TO BAN CHLORINE

By Ivan Amato

photographs by [illegible]

Environmentalists insist chlorine must be banned from use because chlorinated compounds are potentially dangerous to health and environment. Their "precautionary principle" is seductive, but an aggressive phaseout would change thousands of industrial processes and products, disrupting technology and society. Is the fight really about chlorine or...

Some chlorinated compounds may mimic human hormones, with resulting damage to fetal development and reproductive capabilities, and possible influences on sexual orientation, particularly among males. Nor did you bother to point out that we are all unwilling guinea pigs in a massive chemical-saturation experiment. As many as 177 organochlorines have been found in the tissues, body fluids, and even breath of people living in the Great Lakes region.

The article also exhibits an almost total disregard for the ecosystem effects of chlorine and chlorinated compounds, as evidence by the writer's throwaway remark about Rachel Carson and DDT, implying that only effects on humans matter. The Greeks had a word for this attitude: *hubris.*

There is a solid and growing body of data that should make all of us think twice about the use of chlorine in our society.

As for the chemical industry, their attitude can be summed up in eight words: "You take the risks; we take the profits."

— Rick Sullivan, Ph. D.
Grand Rapids, Mich.

THE "PRECAUTIONARY PRINCIPLE," USED TO smear all chlorine compounds with the questionable stain of a few, should not be a halfway measure. The health risks of getting out of bed in the morning dictate, according to the precautionary principle, that all those who subscribe should stay in bed all day — and perhaps avoid eating anything while there, too.

You printed a photograph of Joe Thornton, the Greenpeace advocate of the chlorine ban. I note that he was wearing a denim shirt; I wonder if chlorine was involved in its manufacture or its structure? And what about that watch-band: It sure looks like plastic, not leather (leather would, of course, be a no-no). Implicate chlorine there, too. And what about all the paints Greenpeace uses to identify their property: Aren't some of them made with chlorine? I humbly suggest that if Greenpeace thinks chlorine should be eliminated from commercial and industrial processes, they should start at home.

Suppose the ban — in the U.S. (and Canada) — takes effect. Would they allow all of our industrial competitors to continue using chlorine and selling the products to us? Foreign industry would be delighted at the opportunity to take over our markets using technology banned in the U.S. and Cana-

)

da. Most foreign countries have weaker environmental protection policies than we do, so the problem would get much worse, not better.

—Dan Karlan
Waldwick, N.J.

IN THE CASE OF CHLORINE, THERE IS A VERY clear middle ground that I would have expected Garbage to cover. Obviously, some uses of chlorine have substitutes, and others do not. Most environmental groups suggest reducing the use of chemicals that have alternatives, not banning them outright. Industries paint environmentalists as ban-lovers in order to keep the dialogue away from the real issue: "How can we reduce the chemicals that we have alternatives for?"

The Clinton Administration's proposal would do the following things:

- Examine uses and available alternatives to chlorine in four key products: paper, plastics, solvents, and drinking water.
- Establish a task force including all interested parties.
- Reduce, substitute, or eliminate chlorine where warranted by public health threats and where there are safe alternatives available.

There is nothing radical about reducing or substituting for chemicals that pose public health threats. Cancer is not OK. Neither are threats to our reproductive systems. However, despite the large amount of scientific research supporting the fact that chlorine and many chlorinated compounds are toxic and carcinogenic, your article barely mentioned the public health effects. According to Amato, "No one can claim a causal link . . ." Maybe not on that particular effect. But there is a wealth of science out there that defines many chlorinated compounds as toxic or carcinogenic. By the way, can anyone show that there is *not* a causal link?

The National Wildlife Federation points out that American paper companies that are resisting the shift to chlorine-free bleaching processes, and fail to update their mills to new international standards, will jeopardize their competitive advantages in the world market, seriously threatening the United States' future economic competitiveness in the paper industry. I guess Mr. Amato didn't consult the National Wildlife Federation, did he?

— Kim Donahue
Baltimore, Maryland

building a better toilet

I TAKE ISSUE WITH YOUR FLAG-WAVING, pro-capitalistic, technological view of society. How can and should we all live together on this small, finite planet? I, for one, want something radically different from what you defend under your chlorine and biotechnology banner. I want a society and economy based on participatory democracy, social justice, ecological sustainability, and enrichment of community, families, and individual dignity and self-worth.

You can keep your herbicides and pesticides, your nonstick cookware, your soft-drink syrups, your bioengineered foods, and the other industrial/techno junk you think our economic and cultural survival depends on. I can't take your garbage anymore. Cancel my subscription.

—Tracey Cohen
Highland Park, N.J.

Neglected Toilet

SUMMER 1994

I WAS DISAPPOINTED TO SEE THAT GERBER Plumbing Fixtures Corp. was not listed in your chart of water-wise toilets ("Building A Better Toilet").

[We] make both gravity and pressurized-tank toilets that flush at the 1.6 gallons (ULF) level. Our products have an excellent reputation and are marketed by over 2,000 plumbing distributors throughout the U.S.

For the past two years, I have been using a 1.6 gallon pressurized-tank "Ultra-Flush" in my own home. This toilet removes all of the waste, all of the time, and never requires a second flush. At the company's headquarters in Chicago, we have installed several of our 1.6-gallon gravity "Aqua-Saver" toilets, and they, too, perform to the highest levels.

Water use in residential applications, i.e., toilets, drinking water, showering water and laundry water, represents a small percentage of the total water used in the U.S. Nonetheless, it is important for everyone to continue to conserve water.

—Alan G. Lewis
Chief Executive Officer
Gerber Plumbing Fixtures Corp.
Chicago

Correction: *In "Building a Better Toilet," Summer 1994, the parenthetic note that the North Wales Water Authority encompasses Boston is in error. It is located in Pennsylvania.*

Soured On Milk Hormone

SUMMER 1994

AS A PROFESSIONAL TRAINED IN ISSUES OF environmental and human health, I concur with your recent article ("Udder Angst") that health risks from RBGH seem minor. Yet I telephoned local milk distributors and wrote the Governor and told them all, with passion, that I would not buy milk produced with the artificial hormone. Why? Because rBGH is unnecessary. What pressing societal need does this new creation satisfy? None! Although the health risks from other products of food biotechnology are also not likely to be great, the industry as a whole is another example of our restless species flexing its scientific muscle or, as William Faulkner once so keenly observed, never passing up the chance to meddle where meddling is not needed.

—Timothy D. Burkhardt
Minneapolis

COWS ON rBGH ARE UNHEALTHY. EVEN Monsanto tells you this on the product label: "Use [of rBGH] may result in reduced pregnancy rates in injected cows . . . has also been associated with increases in cystic ovaries and disorders of the uterus during the treatment period."

As for the increase in mastitis infections, which Kennedy mentions only in context of antibiotic use, mastitis is a painful infection of the breast. In cows, this means that the whole udder gets backed up and infected with bacteria, swells up, turns red, and gets hot. If the mastitis infection progresses long enough, it can kill the cow. Researchers at Consumers' Union released a study that reports cases of clinical mastitis in cows on rBGH rises 79%.

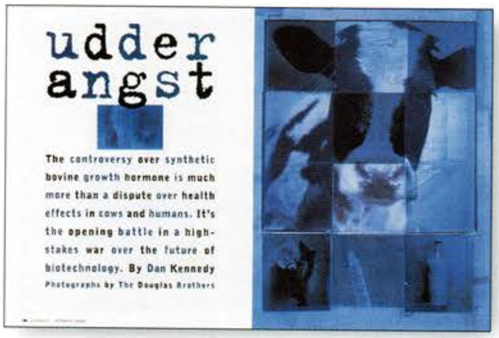
Subjecting cows to a drug that gives them cysts in their ovaries and disorders of the uterus is not a step forward for technology. It is animal abuse. Intentionally giving these creatures more mastitis infections is nothing short of cruel. And we already have more milk than we know what to do with.

With rBGH, there is only one winner: Monsanto. Everyone else loses: the consumer, the farmer, and the taxpayer. But the ones who suffer the most and ultimately pay the hardest price are the cows themselves.

—Andrew M. Kercher
Columbus, Ohio

I AM AGAINST THE USE OF rBGH BECAUSE of the issues raised in your article, but I am not against technology: I am an engineer and scientist.

You indicated that "milk containing antibiotics would be detected by federal inspectors and destroyed." Milk is only tested for four antibiotics. The Government Accounting Office (GAO) determined that as many as 60-some antibiotics (approved and unapproved) are used to treat dairy cows.



udder angst

The controversy over synthetic bovine growth hormone is much more than a dispute over health effects in cows and humans. It's the opening battle in a high-stakes war over the future of biotechnology. By Dan Kennedy

Photographs by The Douglas Brothers

Your article did not emphasize the biggest issue — consumer choice. Recent surveys indicate that 98% of consumers favor labeling. Monsanto's lawsuits are basically an attempt to limit consumer information and choice. In what is known as the material fact provision, the FDA stipulates that it can require manufacturers to put on their labels anything about a given product which consumers view as important. As your article pointed out, consumers want to be informed.

Those who would like to see labeling of products obtained from cows treated with rBGH should ask their Representative to sponsor HR4618 (House of Representatives, Washington, D.C. 20515).

—Kelley Beard-Tittone
Grandview, Missouri

Science In, Fun Out?

SINCE YOUR VERY FIRST ISSUE I HAVE WITH great interest followed your magazine. It has been fascinating to observe the change of focus you have taken, and equally fascinating to note the fervor displayed by your readers. It was often painful to read black-or-white views on very complex issues; and satisfying to read the in-depth analyses being offered with great frequency in the pages of the journal.

I've often wondered about the lack of dialogue within the environmental community; about the fact that only people who agree with the premises of an organization ever read about what the organization has to say. GARBAGE has increasingly been changing the *status quo*, providing a much-needed forum for people of opposing sympathies to communicate with one another.

What leads me to actually write is, however, a sense of wistful sadness over what appears to be an endangered facet of GARBAGE magazine: its sense of fun and practicability. I awaited my early issues with unequalled enthusiasm. I shared it with my friends and my co-workers, persuaded other to subscribe, and read it eagerly from cover to cover. The latest issues, however, have become less immediate, absorbing, and fun than it once was. What price "Science?" It doesn't seem to be a question of format, and the removal of advertising is a blessing. [But] once upon a time it seemed to speak to me as an individual about what I can do to help. Recent issues make me feel useless and ineffective as an individual, as though only scientists and corporations can act or participate in meaningful debate. Plain folks can only watch from the sidelines and try to understand what's going on.

—Lori Harrison
San Francisco

UPFRONT

A QUARTERLY NEWS JOURNAL

RISK ASSESSMENT

Peace of Mind Pollution?

A new report on setting environmental priorities in California urges regulators to weigh the psychological risks posed by pollutants. By Richard Stone

SCIENTISTS AND THE PUBLIC RARELY see eye-to-eye about what constitutes an environmental hazard. Prominent toxicologist Roger McClellan became ensnared in this culture clash in the early 1980s when he was working with a group of clean-air activists in Albuquerque, New Mexico. The activists, recalls Dr. McClellan, now president of the Chemical Industry Institute of Toxicology, urged him to speak out about the dangers of breathing Albuquerque's particulate-laden air. He did desire cleaner air — simply to be able to see the ruddy Sandia mountains that rise east of the city. The activists pressed him. "They said, 'Why don't you tell state officials that the air is bad,'" Dr. McClellan recalls. He refused, however, saying studies showed that concentrations of pollutants in Albuquerque's air were too low to pose a health threat.

For years, many toxicologists have argued that the perceived effect of an environmental risk on human or ecological health should be the sole basis for deciding when to remediate a risk. So conventional wisdom says that cleansing Albuquerque's air — if the air is not a health threat, as Dr. McClellan contends — should take a back seat to trying to rid New Mexico's environment of bonafide toxicants such as nitrates and other agricultural runoff in groundwater. However, a new report stands conventional wisdom on its head. "Toward the 21st Century: Planning for the Protection of California's Environment," a report released in July by the California Environmental Protection Agency, urges regulators to weigh public desires side-by-side with scientific assessments of environmental risks.

"Focusing on the quantitative aspects of risk does not provide enough information on the qualitative aspects, such as anxiety about the future, involuntariness of exposure, and equity concerns," the report states. Following this logic, clean air in Albuquerque becomes a priority because the public would "feel better."

The report is certainly affecting the mental well-being of many California industries, which are unnerved by the prospect of being regulated according to how aesthetically pleasing the environment is. A coalition of businesses — the California Council for Environmental and Economic Balance — aired its concerns about the report to California Governor Pete Wilson. According to the *Daily Environment Report* of the Bureau of National Affairs, Gov. Wilson has responded by ordering CalEPA to distance itself from the report. Agency scientists, in fact, recently were told by superiors not to discuss the report with the press. "The Governor," says William Pease, an expert on environmental health policy at the University of California, Berkeley, who authored part of the report, "has taken the position that the report will scare businesses out of California."

The hullaballoo surprises many scientists and policymakers, who say that science already routinely takes a back seat to public sentiment when environmental-cleanup decisions are made. The report, prepared by the California Comparative Risk Project and headed by CalEPA senior toxicologist Michael DeBartolomeis, was intended to give CalEPA a sense about

PHOTOGRAPH BY *Everard Williams Jr.*

where its priorities should lie in the next decade. "As we talk about setting priorities, we obviously have to take non-scientific factors into consideration," Dr. McClellan says.

Controversial aspects notwithstanding, the report does a good job of giving a face to the otherwise nebulous comparative risk analysis. The project ranked environmental threats according to criteria such as their impact on human health, ecological systems, and society in general. Often a high-ranked risk on one list is a low-priority item on another. For example, environmental tobacco smoke and radon topped the project's list as human-health threats but don't even rate as environmental-health threats. And while lead and greenhouse gases were bogeymen in the realm of social welfare — one of whose criteria is safeguarding the public's "peace of mind" — they were less menacing to human and environmental health.

The report, which involved input from more than 200 scientists, public health officials, environmentalists, and industry officials, even picks up a theme that has become a rallying cry to many toxicologists: Policymakers must consider a compound's non-cancer health effects, such as reproductive and developmental toxicity, in addition to its potential carcinogenicity.

JUST WHAT ARE THE CONTROVERSIAL, non-scientific elements in the report's comparative-risk witches' brew? Some ingredients, such as analyses of the costs of environmental regulations versus benefits, are already becoming standard fare at the U.S. EPA as well as state agencies. Other elements are so fuzzy that EPA hasn't yet attempted to bring them into focus. Take "peace of mind," for instance, which the California report defines as "good mental health, trust of information, personal security, and healthy personal relationships."

"Comparative risk analyses are subjective — a lot of personal experience comes to bear when assessing what is a danger," says EPA Administrator Carol Browner, who wants to see the federal agency develop comparative analysis to help inform its risk-management decisions. The agency, in fact, is committed to heading down this road. Writing in the March 1993 issue of EPA *Journal*, Wendy Cleland-Hamnett, deputy director of EPA's regulatory management and evaluation office, said that better environmental regulations will require "a more participatory model of prioritization" in which issues of equity, social concerns, fiscal feasibility, technological innovation, and legislative mandates "are fully considered alongside the science."

There may be hidden dangers in institutionalizing non-scientific issues in the government's risk management decisionmaking process. Consider how Congress and state leg-

TOP FIVE ENVIRO TRENDS

⊕ What were the major environmental news stories in the first half of 1994? Based on the number of articles filed, Greenwire, a wire service devoted exclusively to environmental reporting, lists the following:

⊕ Under a new California law requiring zero emissions for 2% of new cars by 1998, carmakers are scrambling to design an electric vehicle that will satisfy consumers and reduce pollution from traditional internal combustion engines. Greenwire reports the California act "could accelerate the reinvention of the global automaking industry."

⊕ A growing number of congressional representatives are seeking to eliminate federal mandates that require states to prevent, monitor, and clean up pollution — without providing the funding to do so. The bid to discourage unfunded federal mandates comprises one-third of an "unholy trinity" of proposed amendments that environmentalists believe are impeding progressive legislation. The two others: a bill that would compensate the owners of land devalued by wetlands and threatened species ordinances, and a plan that would require cost-benefit analyses of EPA regulations.

⊕ While some environmentalists support Superfund's strict pollution liability provisions, critics charge it has stymied cleanups and cost taxpayers billions of dollars for little environmental improvement. Greenwire reports it remains unclear whether this Congress will reauthorize Superfund: "Any significant amendments could derail a fragile enviro-industry compromise brokered by the Clinton Administration."

⊕ In June, the Supreme Court placed limits on the federal government's right to require developers to set aside part of their land for public or environmentally prudent uses. In other recent decisions affecting environmental regulations, the Court ruled that local "flow control" ordinances limiting interstate garbage shipments are unconstitutional, and it determined that ash from burning garbage in waste-to-energy plants must be monitored and potentially treated as hazardous waste.

⊕ Reassessing dioxin's health effects, a draft of an EPA study links low levels of exposure to the chlorine-based compound with reproductive disorders, developmental damage to fetuses and infants, weakened immune systems, and cancer. The chemical industry argues that the EPA is relying on inconclusive evidence and eschewing "sound science." The debate over health effects, says Greenwire, "has high stakes for chemical firms, pulp and paper makers, and waste incinerators that produce dioxin-tainted wastes."

CALEF BROWN

"It used to be that we managed the river and let people go where they want to. Now we are trying to manage the people and letting the river go where it wants to." RODNEY HORRIGAN, MAYOR OF CHELSEA, IOWA, A TOWN THAT'S SUFFERED THROUGH 15 FLOODS IN THE PAST 25 YEARS. (NEW YORK TIMES, 6/2/94)

islators go about regulating risk. Legislators tap into the public's fears, and seek input from scientists, environmentalists, and industry officials. The legislators then tell EPA or state agencies which projects they must take on. Such a system may sound rational, but scientists often criticize Congress for making decisions based more on the public's demands than sound science. For example, more than 70% of EPA's budget is spent on Superfund and on removing tainted underground storage tanks — two low-ranked risks, according to traditional toxicological assessments.

If CalEPA warms to the comparative-risk report, it may be able to use the methods developed in the study to show whether its policies are driven by public opinion or science. Dr. McClellan calls this "truth in advertising."

The California report won't change the crux of the debate — the public and their legislators, as always, must decide whether they want to spend tax dollars on tackling health risks or aesthetic eyesores — but it may provide all sides with the means to communicate honestly why, say, hazardous-waste cleanup is one of our top environmental priorities.

RICHARD STONE *is a staff writer at* Science, *where he covers environmental policy.*

Pollution Control: Not a Life-Saving Bargain

⊕ How much does it cost to save a life? That's what a preliminary cost-benefit study by the Harvard School of Public Health attempts to appraise. Based on 1,200 U.S. government regulatory impact analyses that contain cost and life-saving information, the 1994 study calculated expenses in three main categories: medical intervention, injury avoidance, and pollution control.

Life extending medical intervention proves least expensive, averaging $19,000 per life-year saved. Delivering less benefit per buck, injury avoidance controls — from seatbelts in cars to ejection systems in Air Force B-58 bombers — cost an average of $48,000 per life-year saved. Offering the poorest return on invested dollars, environmental regulation — of radiation, asbestos, lead, and other environmental hazards — has a monumental median cost of $2,782,000 per life-year saved.

Some medical procedures, such as prenatal care and childhood immunization, cost less than nothing, while the tab for regulating asbestos averages $1.8 million dollars for each life saved. Dr. Tammy Tengs, one of the study's main authors, points out that we need to reconsider spending money on methods that save lives at great expense. "We could save more years of life [overall]," says Dr. Tengs, "if we are more attentive to the cost of saving each life."

CHUB BUG SHIPPERS

⊕ Two bottom-feeding fish are becoming the new poster fauna for midwestern environmentalists. While lacking the charisma of, say, the spotted owl or the California condor, the sicklefin chub and the sturgeon chub are getting a big hug from a coalition of environmental and tribal groups, who want the federal government to designate the homely fish endangered.

The chub is a bit of a shrimp — a six-incher is a whopper — but it could change the way the federal government controls the Missouri River. The *Kansas City Star* reports that if the U.S. Fish and Wildlife Service declares the fish an endangered species, "the Army Corps of Engineers might be forced to let the river rise and fall more naturally — a change that could cripple the barge industry on the Missouri."

The environmental group American Rivers reports that 95% of the chubs' population has been decimated by dams and levees, which have altered their flood-plain breeding grounds and deprived them of organic material for food. Dams keep the Missouri from flooding regularly, and barge companies, which require steady water levels for shipping, argue that the chub could make them extinct if the navigation season is shortened.

Have Trash, Will Travel

Trash takes to the interstate, as a U.S. Supreme Court ruling leaves local garbage mavens wondering whether their best laid plans for controlling the flow of waste must be scrapped. By Casey Bukro

THE TONE IN BILL DARCY'S VOICE is mocking and taunting.

"Keep that Eastern waste away from Midwest and Illinois landfills," says the president of the Connecticut Resources Recovery Authority in Hartford, Conn. "Keep it in the East. Don't be the dumping ground of the East Coast. Support flow control!"

Mr. Darcy is half-joking as he recalls the furor over garbage exports from Eastern states to the Midwest, an issue that still gets a lot of folks hot under the collar.

But he's not joking about flow control — an issue that once again upsets public ideas about the nature of the United States' solid-waste disposal dilemma. This time, the problem stems from a May 16 U.S. Supreme court 6-3 ruling that says, in effect, that it's OK to ship garbage across state lines as a commercial commodity, but don't try to keep it in state by creating a public-waste monopoly.

"What [the Court] did is harm the municipalities that have done the right thing, the environmentally sound thing, for waste management," insists Mr. Darcy, denouncing the decision as a setback for state and local governments that took the initiative in the 1970s and 1980s to create locally based, integrated waste-management systems.

Landfills offering competitive dumping fees could be the big beneficiaries of the recent Supreme Court ruling allowing shipments of waste across state lines.

EVERARD WILLIAMS JR.

Many of these waste hierarchies are dependent on flow control — a local ordinance that commandeers all the trash within a town's borders and directs the waste-flow to designated, often publicly owned treatment facilities that charge a designated "tipping," or dumping, fee. Such fees help assure bond underwriters that sufficient revenue is available to pay the debt service on the bonds. While flow control is most widely practiced on the East Coast, 43 states employ it.

Connecticut Resources Recovery Authority issued $1 billion in bonds to finance a system that includes five waste-to-energy incinerators, five landfills, five recycling centers, and about 20 transfer stations serving 100 towns with a combined population of 3 million statewide.

"[Our] entire waste management and recycling infrastructure," says Mr. Darcy, "was designed, financed, and operated with flow control from municipalities." Flow control's setback is likely to leave a mess for state and local garbage regulators who can no longer annex local waste streams to support their disposal facilities, but must instead use price to compete for trash in an interstate market.

FLOW CONTROL WAS CHALLENGED IN 1992 by C&A Carbone, Inc., a waste hauling firm in Clarkstown, N.Y. It filed suit against a Clarkstown ordinance mandating that *all* municipal solid waste generated within the town must be delivered to the town's transfer station — at a cost that was $11 a ton higher than Carbone charged to separate and dispose of waste out of state. The town's higher tipping fee paid for the construction and operation of the transfer station.

The Court ruled that the Clarkstown ordinance unconstitutionally interfered with interstate commerce. Justice Anthony Kennedy wrote that the ordinance discriminated by hoarding solid waste "for the benefit of the preferred processing facility," thereby creating a monopoly.

An unwritten message in the court's ruling is that garbage is valuable, a view that's obvious to the pros but might seem surprising to generations of Americans who think of their throwaways as "worthless trash." It is also a reminder that garbage is always viewed by the public as a crisis of some kind. In the '70s and '80s, conventional wisdom held that the U.S. was running out of landfill space. This was spurred by the general refusal of many states to issue permits for new or expanded landfills, and by horror stories from the East Coast of dwindling space and tipping fees of $140 a ton or more.

So market forces took hold in the $25-billion-a-year trash industry. Giant waste-disposal firms such as WMX Technologies, Inc. (formerly Waste Management, Inc.) began buying landfill space for the next 20 years; some of its territories now have surplus space. Trash began to flow across state lines in increasing quantities, as loads once destined for local dumps were diverted to landfills hundreds of miles away.

The sluggish economy of the early 1990s slowed waste generation. Waste reduction programs and recy-

"AN INSIDE LOOK AT PAPER RECYCLING" (Sept./Oct. '93)

Attaining its goal two years ahead of schedule, the U.S. paper industry recently announced that in 1993, for the first time, more paper — 40% of the total produced — was recycled than sent to landfills. Paper, which takes up more landfill space than any other single material, is targeted for a 50% recycling goal by the year 2000.

An Inside Look at Paper Recycling

Recycling success continues to be dictated by the performance of end-use markets. When supply outdistanced demand in the 1980s, some New Jersey cities *paid* up to $40 a ton to have old, recyclable newspapers hauled away. As newsprint mills have increased their capacity for using recycled fiber in paper production, the market for newsprint has rebounded, and cities are now being paid up to $56 a ton for yesterday's news. The price of high-grade white office paper that can be reprocessed into quality writing paper increased 30% in the past year alone.

"DOING THEIR LOW-LEVEL BEST" (Dec./Jan. '93) Chem Nuclear Systems' radwaste disposal site at Barnwell, South Carolina closed its doors this past July, leaving low-level radioactive waste from 31 states without a final resting place. (Eight southeastern states will continue shipping radwaste to the site.) The only remaining active radwaste disposal facility in the U.S, located in Hanford, Wash., accepts waste from just 11 states in the Northwest. • Little action has resulted from the Low-Level Radioactive Waste Policy Act of 1980, which requires states to build regional disposal facilities. Although most states have banded together to form six "compacts" in the Central, Midwest, Southwest, Central Midwest, Appalachian, and Northeast, not a single new site has opened for disposal. The Nuclear Regulatory Commission reports that it hasn't even received a single *application* for a low-level radioactive waste disposal site. Hospitals and medical facilities are expected to be particularly hard hit by Barnwell's closing. Some radioactive waste can be stored until radionuclides decay to safe levels — a matter of several days to a few months, depending on the type of radioactive isotope. When the radioactivity has decayed to a safe level, the waste can be sent to a municipal solid waste landfill. However, radwaste containing longer-lived radionuclides, which was previously sent to Barnwell, is now piling up at nuclear facilities, hospitals, and research labs throughout the U.S.

Doing Their Low-Level Best

cling are further stemming the flow of materials to landfills. But the garbage glut hasn't vanished. People still create a lot of garbage. It's just that the U.S. has found a creative way to deal with it. Instead of banning the importation of trash from out of state (a practice that was invalidated by the Supreme Court in 1978), state and local governments opted for a pro-active approach: taking control of their own waste and directing it to recycling and disposal facilities financed through flow control.

Garbage never loses its ability to incense somebody, and the Supreme Court ruling provides another focus for that anger. As usual, passionate opinions are held on both sides.

The National Solid Wastes Management Assn. in Washington, D.C., a trade group representing the garbage industry, is delighted with the decision to strike down flow control. That's hardly surprising, since the Supreme Court ruling could offer a competitive edge to disposal sites that slash tipping fees below those charged by flow-control facilities.

Sheila Prindiville, the association's executive vice president, notes that flow control got started as a way to guarantee payments for expensive waste-to-energy plants, since they generally charge higher disposal fees than landfills. Ms. Prindiville calls flow control "economic protectionism" and "taxation by another name."

The National Association of Counties opposes the Court's ruling, fearing that it may force counties and cities to raise taxes to offset the loss of revenue under flow control schemes. If the ruling holds, taxpayers could be hit hard in the pocketbook. After all, cities and counties are taxing bodies, and taxes raise money for services if other revenues are not available. The group is supporting bills in the U.S. House and Senate that would validate existing flow control ordinances.

Unless Congress resolves the waste-shipping issue, the future of garbage disposal in the U.S. promises to remain murky.

"There is a lot of uncertainty about what the ruling means and what will happen next," says Charles Foshay, executive director of Regional Waste Systems, Inc., in Portland, Maine. The regional system operates an $85 million trash-to-energy facility for 31 towns with a combined population of 240,000 people in southern Maine.

"What concerns me is the investments of the mid '80s and into the '90s made a very substantial change in the way we handle wastes," says Mr. Foshay, noting that these expenditures — for building composting and recycling facilities, as well as trash-to-energy plants — were made in response to public fears over energy shortages, too much garbage, smelly garage dumps, and what was seen as a national throw-away mentality.

Without flow control, contends Mr. Foshay, "there is not going to be investments" in disposal systems designed to reduce wastes. "Things will go stagnant for a long time if this [Court ruling] goes into effect."

Mr. Foshay pondered it some more, and added: "I thought we were supposed to move way from landfills, not back toward them."

CASEY BUKRO, *a 25-year veteran of the environmental beat, is a staff reporter at the* Chicago Tribune.

Ecological Vital Signs Improving

⊕ "Problems regarding pollution and the environment will get significantly worse during my lifetime." That's what 75% of the 1,036 people polled last July told the Wirthlin Group, a national polling firm. Not so, says "Leading Environmental Indicators," a report published by San Francisco-based Pacific Research Institute for Public Policy, a non-profit think tank funded by a number of major corporations.

Ecological health rallied dramatically since 1970, says Pacific Research. The biggest success story: air quality. Data collected over the past 25 years show reductions in emissions and ambient quantities of air pollutants such as sulfur dioxide, which has dropped 25%. Declining just slightly nationwide, ground-level ozone has diminished dramatically in U.S. cities. The number of cities exceeding the federal ozone standard dropped from 97 to 56 between 1990 and 1992.

All data in the report were taken from government sources, including the EPA and the President's Council of Environmental Quality.

CALEF BROWN

AT ISSUE

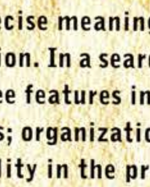
using the internet · toxic cleanup with microbes · chemical agriculture
GARBAGE
the environmental movement from edward abbey's stirring iconoclasm to the moans of "backlash"...
what next?

To the uninitiated (or uninterested), the word "environmentalism" appears well defined. Only once you're in the arena does the label lose any precise meaning. The concept is full of complexity — and contradiction. In a search for definition, we describe a rough triangle with three features in this issue: philosophy and values in the Abbey journals; organizational mission in the "backlash" piece; and political reality in the profile of Bruce Babbitt. The implied contrast between, say, the apolitical, black-sheep environmentalism of loner Edward Abbey and the '90s environmentalist politicalanimal that is Bruce Babbitt is instructive. And intentional.

The piece on high-yield farming as an antidote to habitat destruction by land clearing is from Ron Bailey, author of the widely read (and controversial) *Eco-Scam*. Rounding out the issue is an unhyped look at bioremediation, its limitations and potential, by National Research Council scientist Jackie MacDonald.

Confessions of a Barbarian

by Edward Abbey
(page 20)



Edward Abbey began keeping a journal in 1948 at the age of 19, and continued to do so until his death at age 62 in 1989. He amassed 20 volumes, although the three earliest were destroyed by flooding.

Born in Home, Pennsylvania, Abbey would later be known for his ties to the American Southwest and his championing of a "no-compromise" brand of environmentalism. He wrote eight novels and a dozen volumes of non-fiction in all. His most widely acclaimed books are *Desert Solitaire*, an autobiographical account of a season as a backcountry ranger in Utah's Arches National Monument, which is widely regarded as a classic in American Western literature, and *The Monkey Wrench Gang*, a story of ecological retribution that inspired the enviro group Earth First!

◆ ARTICLE SUMMARY

In our excerpt's opening entry, an account of a conversation with tourists at Arches, Abbey exercises a faculty that often is absent from environmental writing: humor. Echoing throughout the journals is a comedic voice that often is joyfully, politically incorrect. Abbey was equally adept at spewing bile, as when he declares in a Nov. 1979 entry that "Man has become . . . a pestilence upon the Earth." (Shades of deep ecology?)

The June 25, 1959 entry, recorded during a float trip down the Colorado River, reveals the seeds of Abbey's "monkeywrenching" philosophy of environmental defense that is at once ironic, anarchic, and moralistic. In fact, Abbey's strong moral bent is ever present in his journal entries, revealing itself most tellingly in an extended internal diatribe from his Aztec Peak firetower on the "Enemy" — human greed and consumerism.

Abbey wrote that Nature is the only thing that "engages my full sympathy." But the entries show that his foremost concern was, in fact, writing itself: his sketches of other writers, his groping toward a definitive style, his bitter (and funny) disputes with literary critics. "Why I write," he wrote in 1982: ". . . to challenge, provoke, stimulate, even to anger if necessary — whatever's required to force the reader to think, feel, react, make choices."

◆ AT ISSUE

Abbey was a giant among the modern environmental movement. And in the five years since his death, he has attained a reputation of near-mythical proportions among enviros and other readers. Who was the real Ed Abbey? The journals separate the legend from the man, revealing his deeply conflicted attitude toward deep environmentalism — and a fistful of other, competing concerns.

What Are We Fighting For?

by Robert Braile

(page 28)

Bob Braile, a correspondent for *The Boston Globe* since 1987, reports on environmental issues throughout New England. Prior to joining the *Globe*, he spent four years reporting on the environment for the Long Island section of the *New York Times*. Mr. Braile studied at Bucknell University, receiving a degree in History and English. During the 1994-1995 academic year, he will be a visiting instructor of environmental studies at Dartmouth College, where he will teach environmental journalism.

◆ **ARTICLE SUMMARY**

Bemoaning a "backlash" from legislators, businesspeople, and some journalists, the major environmental groups are struggling to redefine their values and goals. No longer able to define itself simply in terms of what it opposes, the environmental movement must articulate what it stands for. This at a time when Congress seems set on weakening some of America's premier environmental laws, and grassroots environmentalists appear to be pulling away from the national organizations.

Some environmentalist luminaries argue that the false perception of the Clinton Administration as environmentally friendly has given the opposition a foothold, while lulling the greens into complacency. Big industry has even taken a page from the environmental movement's book of tactics, promoting itself as concerned for the environment while, in some cases, continuing to pollute and degrade that which it claims to protect.

Lacking blatant symbols of ecological degradation, the cause has lost momentum. Problems that are easily fixed have been fixed; complex, global challenges are rife with scientific uncertainty. Many environmental groups seem incapable of acknowledging success stories, leaving critics to ponder whether anything will make them happy.

◆ **AT ISSUE**

By hammering at the evils of their enemies for so long, the national environmental groups have forgotten how to rally around their own cause. How can the environmental movement bring a positive vision to its missions? Grassroots groups — focused on specific problems that empower local citizens to bring about change — may embody the movement's future.

The View from the Citadel

by Bill Gifford

(page 36)

Bill Gifford is a freelance environmental writer living in Washington, D.C. He has contributed to *Rolling Stone*, *Outside*, the *New Republic*, the *Washington Post*, the *New York Times*, and the *Washington [D.C.] City Paper*, an alternative newsweekly where he's a part-time staffer.

◆ **ARTICLE SUMMARY**

Before his appointment as Secretary of the Interior, former Arizona Governor Bruce Babbitt won kudos from the green elite. Now he's under fire from all sides — land developers, ranchers, miners, timber companies, and especially environmentalists, his supposed allies.

Despite presiding over an agency that was legendary for its subservience to extractive industries and lately has been hobbled by conflicting environmental mandates, Babbitt is a consensus builder who wants, and often gets, results. He is known for talking tough on an issue, but later encouraging compromise to strike a deal. And therein lies his challenge, because negotiating between hopelessly polarized parties is a recipe for stalemate.

Babbitt is the chief architect of what ranchers call the Clinton Administration's "War on the West." His grazing reform package, which would raise grazing fees on federal land, faces a monumental Congressional battle. The troubled Endangered Species Act, due for reauthorization from a bloodthirsty Congress in 1995, could well determine history's verdict on this Interior Secretary. For Babbitt the astute politician, such battles are most definitely win or lose propositions offering little in the way of compromise. For Babbitt the ecologist, they are components of a larger picture — promoting sustainable resource use while protecting major ecosystems.

◆ **AT ISSUE**

Bruce Babbitt hasn't turned around western land management policy during his time in office. But he has used the office to test the boundaries of debate and reach for a middle ground. Could Babbitt be forging a new kind of pragmatic environmentalism, one that strives for concrete results instead of deadlock?

Once and Future Farming

by Ronald Bailey

(page 42)

Ron Bailey grew up on a self-sufficient, family-owned livestock farm in Virginia. He is the producer of *Think Tank*, a national weekly public television series based in Washington, D.C. His articles on science and the environment have appeared in *Forbes*, the *National Review*, the *Public Interest*, and *Reason*. In Mr. Bailey's words, his 1993

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book *Eco-Scam* (St. Martin's Press) "holds the environmental apocalyptics of the past 25 years strictly accountable for their faulty analyses and their wildly inaccurate predictions." Research for "Once and Future Farming" was conducted while Mr. Bailey was the Warren Brookes Fellow in Environmental Journalism at the Competitive Enterprise Institute.

◆ ARTILCE SUMMARY

Despite plummeting fertility rates, human population will continue to rise for at least another generation because of declining death rates. Food production over the next century must increase sharply to keep pace with such soaring population growth.

Although modern cultivars have been developed that are pest and drought resistant, pesticides and fertilizers must continue to play leading roles in boosting crop yields. Low-input, "sustainable" agriculture advocated by some environmentalists threatens wildlife habitat by requiring more land to be devoted to crop production. Integrated Pest Management and organic-farming techniques alone cannot protect species diversity.

The efficacy of pesticides and other synthetics eclipses their minimal health risks, which according to University of California at Berkeley biochemist Bruce Ames induces far less than 1% of all human cancers. Fertilizer can triple or quadruple plant yields, and while overfertilizing can pollute water and degrade the environment, underfertilizing, which slashes agricultural output, means farmers must till more natural areas.

◆ AT ISSUE

The critical debate among food policy experts is whether or not chemical-based farming is a remedy for agriculturally induced destruction of natural habitat or a bane to ecosystems.

Should farmers adopt a more holistic approach to land management based on organic-farming techniques? Or would such a tack require additional farming of wildlands and fail to feed a world population that is expected to double in the next 50 years?

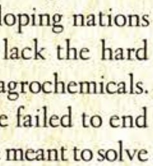
◆ COUNTERPOINT (PAGE 49)

Paul Faeth, senior associate in the economics and population program at World Resources Institute, disputes Mr. Bailey's position. He reports that soil productivity losses and surface-water pollution mean that current farming practices in many areas cannot be sustained much longer, much less exported to developing nations where many farmers lack the hard currency to purchase agrochemicals. In fact, pesticides have failed to end the problems they were meant to solve — hundreds of insect species have developed immunities to pesticides.

Research from World Resources Institute demonstrates that peasant farmers who switch from traditional farming practices to readily available organic ones can reduce environmental damage and maintain higher crop yields, and thus earn more income.

Germ Warfare

by Jacqueline MacDonald
(page 52)



Jackie MacDonald directs studies on water-pollution cleanup technologies for the National Research Council, the scientific advisory institution that carries out studies on behalf of the National Academy of Sciences. She holds an M.S. in environmental science in civil engineering from the University of Illinois, and a B.A. in math from Bryn Mawr College. She has written about drinking-water treatment technologies for GARBAGE and about groundwater cleanup technologies for *Environmental Science & Technology*.

◆ ARTICLE SUMMARY

In situ, or "in place," bioremediation is a fast-growing technology that employs microbes to clean up contaminated sites. It's an attractive alternative to burn or bury disposal methods that are traditionally used in hazardous-waste cleanups. *In situ* bioremediation is less intrusive, costs less, and has been used successfully on petroleum-based pollutants. (It's less effective with complex contaminants.)

What works in the lab does not always work in the field, however. In a rush to capture a chunk of the enormous market for cleanup of hazwaste sites, some companies have promised more than their technology can deliver. There are many instances of failed projects resulting from poor design by unqualified vendors.

While not a panacea for all cleanups, application of bioremediation is growing. The market is expected to expand significantly over the next decade, but many in the business are clamoring for government regulation so this promising industry will not be discredited by an unscrupulous few.

◆ AT ISSUE

Are the claims about the benefits of this cleanup method correct? If not, what are its limitations?

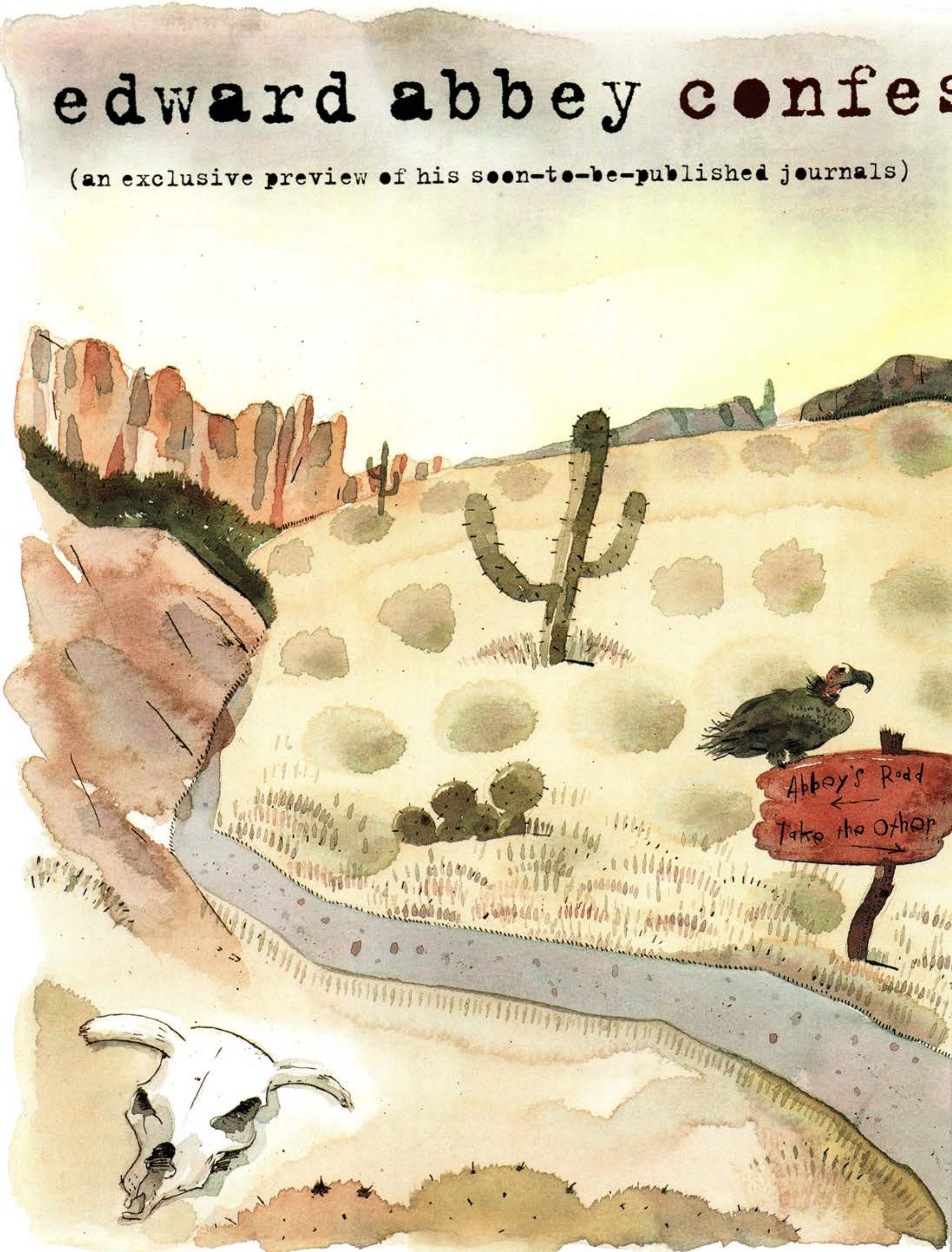
As with so many questions involving emerging fields of science, the answers are not clear. Indeed, descionmakers at contaminated sites are confronted with a paradox: *In situ* bioremediation is both oversold and underused.

Coming Next Issue

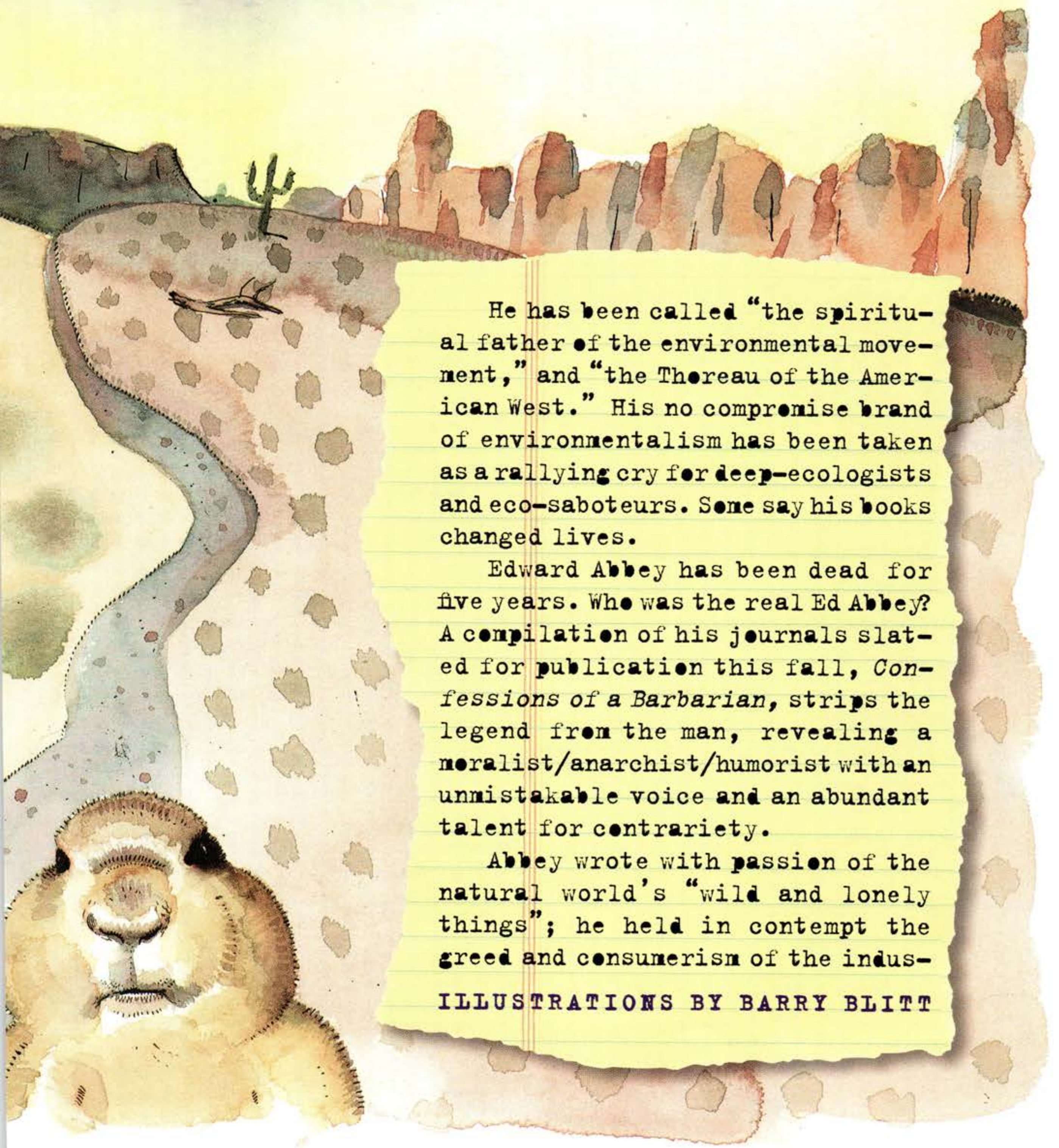
Fished Out From GARBAGE's hometown of Gloucester, Mass. — the nation's oldest fishing port — author Deborah Cramer tracks the collapse of commercial fish populations in the North Atlantic, and takes on the question of whether the conservation plan to rebuild stocks can really work.

edward abbey confes

(an exclusive preview of his soon-to-be-published journals)



sions of a barbarian



He has been called "the spiritual father of the environmental movement," and "the Thoreau of the American West." His no compromise brand of environmentalism has been taken as a rallying cry for deep-ecologists and eco-saboteurs. Some say his books changed lives.

Edward Abbey has been dead for five years. Who was the real Ed Abbey? A compilation of his journals slated for publication this fall, *Confessions of a Barbarian*, strips the legend from the man, revealing a moralist/anarchist/humorist with an unmistakable voice and an abundant talent for contrariety.

Abbey wrote with passion of the natural world's "wild and lonely things"; he held in contempt the greed and consumerism of the indus-

ILLUSTRATIONS BY BARRY BLITT

"I like my own company."

trialized world. But neither could he abide environmentalists' tendency towards mysticism ("Zen bullshit"), their politics ("chickenshit liberalism") and, especially, their insistence on reading him through a prism of their own ("thus misrepresenting my books"). Yet, he did indeed inspire the modern environmental movement, which he at once honored and abhorred.

"It is no longer sufficient to describe the world of nature," Abbey wrote. "The point is to defend it." That kind of moral certitude continues to sustain the environmental movement, even as it has passed beyond the personal and iconoclastic to the mainstream and bureaucratic. But what of his anarchist tendencies? They, too, are a measure of the man. Environmentalists who made him a "martyr" (his word) for their new religion might wonder: Which of Edward Abbey's voices shall we heed, as we head toward the next millennium?

* * * * *

july 1956, arches

Abbey's account of a season in the wilderness of Utah's Arches National Monument, where he worked as a backcountry ranger, contains the first seeds of his book, Desert Solitaire.

ME AND THE TOURISTS:

O, I'm a comedian. A tourist says to me, "That's a lousy road you got in here," and I say, "If I had my way, there wouldn't be any road atall in here," and they laugh and laugh. "You have TV here?" another tourist asks, and I say, "If I saw a TV set in here, I'd shoot it like I would a mad dog," and they laugh again. "Well," says a third, "what do you do for entertainment?" and I say, "I talk with the tourists," and they laugh and laugh and laugh.

There I am, deadly serious, and they stand there just a-laughing at me. "Don't you get lonesome out here?" says another tourist, and I say, "I like my own company, I get along with myself pretty good." And another tourist says, "You got an awful job." And I say, "I'd a lot rather be doing this than what you're doing," and they all start laughing again. Nobody takes me seriously.

Tourist says, "Does it ever rain out here?" And I say, "I don't know, I've only been here twenty-eight years." They go for that one, too. Laugh, Christ!

Excerpted from *Confessions of a Barbarian: Selections from the Journals of Edward Abbey.* Edited by David Petersen; to be published by Little, Brown & Company in November. ©1994 by Clarke Abbey.

* * * * *

june 25, 1959
glen canyon, colorado river, utah

A float-trip in a rubber dinghy down the Colorado River through Glen Canyon, which was dammed in 1966, spurred Abbey's earliest brooding on direct-action environmental defense — which he later dubbed "monkeywrenching."

LAUNCH-OFF; WE BEGAN OUR THIRD DAY on the great river. The rapids turned out to be mostly nothing — we didn't even get wet. Then we resumed our leisurely gliding drift down the river (down the river! down the river!).

More great cliffs, sandbars, shores where jungles of willow, tamarisk, oak, and cane sheltered mysterious and largely quiet birds. Solitary bird calls, little ripples and gurgles of water, the puffing of our pipes (*à la* Huck Finn!), occasional queer uproars in the water as the silty river bed altered its conformations.

Ah, so wild, lonely, sweet, primeval and remote — far far from anywhere: Blanding the nearest town at least a hundred miles away — nothing around us in any direction but miles and miles of naked wilderness; if not *pure* wilderness, certainly primitive. And original—bare rock, those hummocks of sandstone, pine as ham, buff as sand, extending ten twenty thirty forty miles away from the river. Now and then, as our twin boats turned in the current, we were offered a farewell glimpse of one of the Henry Mountains — rising above and beyond the canyon walls, far, off, green and gray and blue and tan.

Every bend in the canyon promised new visionary delights, and seldom failed to deliver. It seemed to us that Glen Canyon became more beautiful and wonderful with every mile. We cursed the engineers and politicians who had condemned these marvels and the wildlife sheltered by them to death by drowning.

How much dynamite, we wondered aloud to each other, would be needed to destroy the dam? How delightful and just, we imagined, to have our dynamite so integrated into the dam's wiring system, that when the president or the secretary of the interior and the Four Corners' governors, together with their swarms of underlings, the press and hordes of tourists had all assembled for the Grand Opening, it would be the white pudgy finger of the biggest big-shot, pressing the little black button on the beflagged switchboard, that would blow to hell and smithereens the official himself, his guests, the tourists, the bridge, and Glen Canyon Dam. A sad and hopeless fantasy....

* * * * *

august 15, 1959
albuquerque

STYLE:

Conrad. To write of — no, to do for the desert what he did for — of — the sea. But I must avoid his rich flowing organ-valved almost lush (tropical) style. Emulate his passion for the exact. My style: something almost harsh, bitter, ugly. The rough, compressed, asymmetrical, laconic, cryptic. Cactus. Old juniper. Rock, dry heat, the stark contour.

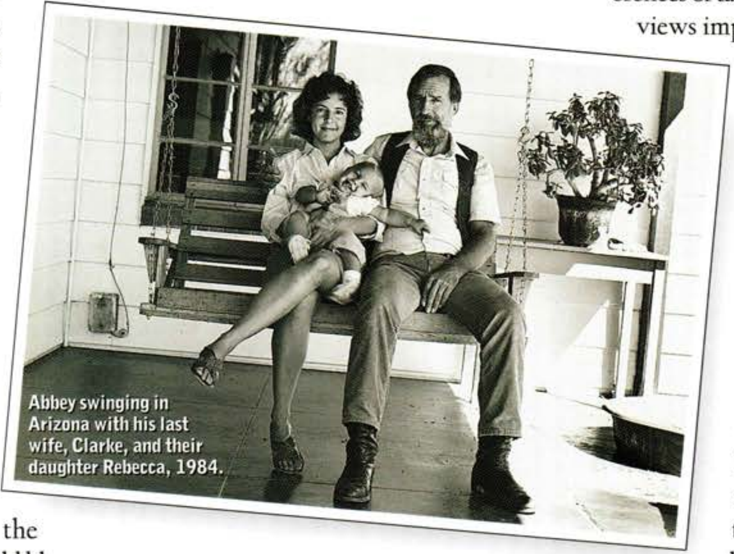
NO FOG. NO GODDAMNED FOG.

Mood, tone, feeling.

Combine intensity (not density) with clarity. *Clean* and *intense*. Like the desert landscape, the desert light, the desert atmosphere —clear, intense and infinitely suggestive. Hard distinctions, precise outlines — but each thing, suggesting, somehow, everything else. As in truth each thing does.

december 5, 1962
hoboken

Abbey lived periodically in Hoboken, N.J., to be near his second wife's family. His time there gave him a closeup view of the Eastern literary establishment.



Abbey swinging in Arizona with his last wife, Clarke, and their daughter Rebecca, 1984.

ON LITERARY CRITICISM:

So-called American literary criticism is a hoax and a fraud, because it makes a pretense of objective judgment in a field where only subjective preferences are valid. *It has no authority or validity whatsoever.* The only reason it appears to wear an air of authority is because it is inculcated through years of public schooling and because the opinion of any given critic is usually shared by all other professional critics. This near-unanimity does not give the critic's evaluation any weight; it merely demonstrates the strong herd-instinct of the literary professors, who tend to move in unison like a flock of starlings or a school of fish. Their erratic flights reflect merely the transience and mutability of literary fashions.

The men who make a good living writing about the work of their betters would actually be more appropriately occupied in the designing of women's apparel. Otherwise, failing this, they should stick to their classrooms and not presume to impose their private opinions upon the public under the pretense of established, authoritative judgment.

The professors tend to support one another not only out of "professional ethics," but because frank and open dispute among them would expose their game for what it really is, i.e., private preferences of taste and / or personal world-views imposed upon the captive audiences of classrooms and a gullible public under the masquerade of a consensus of established evaluation....

In the field of literature, as in politics, we can only follow the democratic dictum of "one man, one vote." When the critic dislikes a certain author, let us say, because of personal animosity, or disputes the author's point of view, he is on legitimate ground. But when he pretends to pass judgment on the overall worth of an author's work on certain canons of literary esthetics, he is perpetrating a fraud and a hoax.

If we allowed these people to meddle too much in literature, then all literature would soon consist of nothing but the careful, cautious, correct work of such as Austen and James.

* * * * *

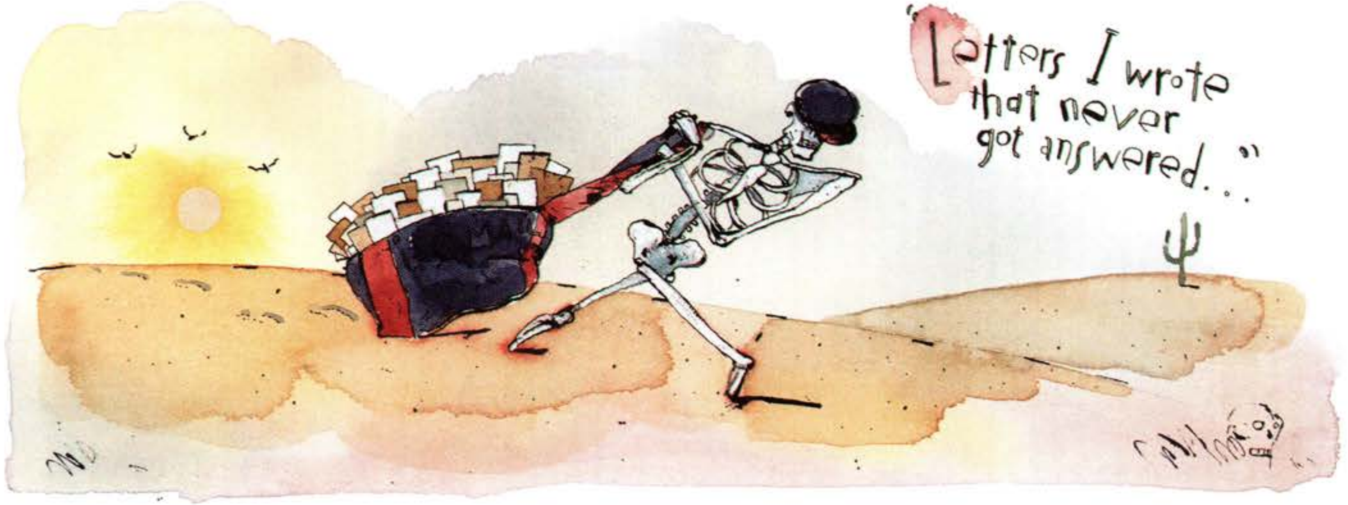
dec. 13, 1966
death valley

Abbey completed Desert Solitaire *while working as a school-bus driver in Death Valley.*

FROM A LETTER TO AL SARVIS:

"Frittering my life away"? Perhaps. I don't know. What *should* a man do? I'm assailed at times by a sense of desperation — in seven weeks I'll be forty years old and still don't know with any precision who or what I am. Or why. Booze is but a palliative and my one experiment with LSD was an uncomfortable and inconclusive failure: the stars quivered in a cloudy cobweb but the big spi-

JAY DUSARD


"Letters I wrote that never got answered..."

der-God failed to appear....

I am resolved, therefore, to continue on my present course: to compose somehow the one good novel; to try to be good to my wife; to run Cataract Canyon in a kayak; to raze more billboards; to build that solid house of rock and wood far out somewhere, where my sons and grandson can find at least a temporary refuge from the nightmare world of 2000 A.D.; and to be ready, with rifle or rood, for the apocalyptic showdown which yet may come — I hope — in our lifetimes....

* * * * *

august 25, 1975
numa ridge lookout

The Monkey Wrench Gang was published while Abbey was manning a fire lookout in Glacier National Park, Montana.

MWG [THE MONKEY WRENCH GANG] APpears a flop so far. Turned down by book clubs, no progress on movie screenplay, no big advance sales, and no raves yet from reviewers or other writers. Nice mentions in *Audubon*, *Playboy*, a few newspapers, but that's all. Oh well, so it don't sell. That — as Gaddis says — is the publisher's problem. Of course, the official publication date is still seventeen days away. One more book down the well of oblivion.

Doubtless I'll be accused of a rash of crimes now. Every time some Boy Scout sugars a bulldozer, or shellacs an earth-mover, they'll come looking for me. The men in blue, with their tiresome questions. Ah well, martyrdom, I'll try it on for size. Though the cut of the garment doth not appeal.

* * * * *

october 29, 1976
moab

MWG FINALLY REVIEWED IN NEW YORK TIMES — one year later — by Jim Harrison. Favorable notice; but misrepresents the book as a "revolutionary" tract for the old "New Left." Jeez! No mention of the comedy, the wordplay, the wit, humor, and brilliance!

I'm reading MWG for the seventh time — not bad, but too many words. Too fucking goddamn many fucking words. Urgently needs a ruthless blue pencil. Alas, too late. "Arch, uneven, verbose, verbiage." (*Publishers Weekly*)

The paperback edition contains about a hundred typographical errors.

* * * * *

july 7, 1977
aztec peak fire lookout
arizona

From atop a fire lookout on Aztec Peak, Arizona, Abbey scribbled humorous fragments as well as extended musings, some of which grew into several of the essays collected in Abbey's Road *and elsewhere.*

LETTERS I WROTE THAT NEVER GOT ANSWERED:

"Dear Judy Collins ... bring sleeping bag...."

"Dear Gary [Snyder], I like your stuff too, except for all that Zen and Hindu bullshit...."

To the Editors, *Ms.* magazine, NY: "Dear Sirs...."

"Dear Jean Sibelius: Happy Birthday."

To bill collectors and lawyers: "Edward Abbey regrets...."

"Dear Ambassador Dobrynin...."

— AND LETTERS TO ME THAT NEVER GOT Answered:

"Dear Edward Albee...."

"Dear *Señor* Abbey, please send two (2) pr cowboy pants...." — Mario Roderigo Rodriguez-Silva ("call me Rod")

"Dear Mr. Abbey, Do you have any idea how funny you are? In a sick way, I mean...."

* * * * *

august 11, 1977
aztec peak

B. TRAVEN, DREISER, JAMES JONES ET AL — their prose is so bad, so crude, so stupid, that it's painful to read. And yet these lads often wrote better books than such master stylists as Henry James, Nabokov, Proust. Why? Perhaps there's something in great verbal felicity that misleads the writer, that betrays him into technique for the sake of technique;

"The fallacy of contemporary science."

while the simpleminded prose writers, free of such allurements, are able to keep their attention fixed on the subject of their interest — the real life of actual human beings. Thus, their work, while repellent in style and detail, achieves great cumulative power through its steadfast devotion to fact, which equals and in the long run is equivalent to, the supreme poetry of truth.

The greatest writers were those, are those, capable of both powers: i.e., Tolstoy, Conrad, Chekov, Hemingway, Cervantes, Steinbeck, and so on.

* * * * *

july 22, 1978
aztec peak

EINSTEIN WAS NO DOUBT A GREAT MATHEmatician. All the mathematicians tell us so. But his true greatness lay not in his specialized talent, but in his humanity — in the fact that he cared about what is happening to our world. His greatest practical gift of humanity — the nuclear bomb — does not impel much sense of gratitude.

Nothing could be more foolish than to base one's moral philosophy on the vagaries of science. Whether the world began with a Big Bang, an act of special creation or always existed, has nothing of importance to do with the way we treat one another, our fellow creatures, and this sweet planet earth.

The most common fallacy of contemporary scientism is the attempt to apply far-out, exotic scientific theory (relativity, e.g.) to ordinary, everyday, inductively empirical reality. Most scientific doctrines are based on, and require, extremely elaborate and long strung-out chains of inferences. They are seldom or never based on direct sensory experience. Therefore, they do not constitute knowledge. Information, yes; science gives us information. But not knowledge — *knowing* — and far less, wisdom, understanding, sympathy, love — each implying and entailing the others.

* * * * *

august 5, 1978
aztec peak

AZTEC — EVENING AND ALONE: MY WIND chimes tinkle gently. Storm cells growl and flicker in the north — thunder, lightning, curtain of rain. The sun going down in a solemn radiance of purple clouds, rimmed in scarlet.

Quietude. The distant cries of a hermit thrush — that flutelike song, deep in the dark and piney woods.

Why, in all this peace and beauty, should I trouble my soul with thoughts of war, politics, the endless battle to save a little of free, wild, agrarian America?

Why?

I don't know. Some vestigial sense of honor, I suppose. The less honor we have left — after all these decades of compromise, trade-offs, cowardice, evasion, temporization, equivocating, fence-straddling — the more urgently we cling to what sense of honor still remains. I love the hills and the fresh wind, the desert and the sea, the forest, the swamps, the rural towns of America. I am obliged, therefore, morally obligated, to defend these things against the Enemy. Honor requires it.

The Enemy? We all know who the Enemy is. The Enemy speaks to us all the time — from the radio, on the television, on billboards, in the newspapers and slick magazines, in the halls of Congress, at the state capitol, in city hall.

And the Enemy says, "Behold, how sleek and fat I have become. Am I not the wonder of the world? Am I not the richest and most powerful beast on earth? Would you turn against the thing which has enriched you, which has given you safety and security and comfort, which promises you still more wonders in the future — electronic toys, computerized thinking, a life air-conditioned from womb to grave, an existence of endless novelty, luxury, diversion, things and more things, a universe of sport and adventure and romance and travel in the softness of your armchair, the ease of your V-8 four-wheel-drive wheelchair tourism, the sedation of your living room? A painless, discreet, sedated death? And all this for so little, so very little — merely for the price of some of your independence, a bit of your freedom, a little part of your manhood or womanhood, for only a little sacrifice of your humanity and honor...."

Law and Order are not enough. Law and *Justice* is what I want. To hell with order! To hell with the law! I'll settle for justice, though the heavens fall.

(I realize this attitude is not merely a nuisance, but a great bore to almost everybody. I wish I could change; I wish I could adapt; I wish I could accept, with peace of mind, the standardized, institutional view of things. But I can't. There's something wrong with me. I'm a sick man, no doubt about it.)

* * * * *

november, 1979
tucson

THE MORE IMMORAL, OR UNJUST, OR IGNOBLE an activity or belief, the more ferociously do its adherents feel obliged to defend it, and the less tolerant they become of any whisper of dissent.

In myself, I find a tendency to hate or oppose or despise anything I cannot do or cannot understand: e.g., mathematics, physics, ballroom dancing, gourmet cooking, Henry James, Jane Austen, etc. And in fact I'm beginning to feel a deep revulsion against the whole goddamn human race, excepting a few friends and loved ones. Only Nature engages my full sympathy anymore. And art.

The war of mankind against other living things: Man has multiplied to the swarming stage, become a scourge and a pestilence upon the earth, a threat to all life, including his own. *Man the Pest.*

* * * * *

july 12, 1982
dead cow ranch
alamosa, colorado

THE MWG MOVIE OPTION EXPIRES AT THE END of this month. Then what? Gary Snyder, in a letter to Dave Foreman (Earth First!), says they'll never make a movie of MWG. And why not? Because MWG attacks not human lives — cheap — but property. And in our culture, property is sacred, valued far above human life. (The neutron bomb, e.g.)

* * * * *

october 4, 1982
tucson

In 1982, at age fifty-five, Abbey was told that he had terminal cancer and just six months to live. He bulled on for another seven years.

HOAGLAND NOMINATES ME FOR THE National Institute of Arts and Letters (he says). Why? The name Edward Abbey needs no adornment. (To paraphrase B. Shaw.)

* * * * *

WHY I WRITE:

Not so much to please, soothe, or console, as to challenge, provoke, stimulate, even to anger if necessary — whatever's required to force the reader to think, feel, react, make choices. Such is my aim. (What's yours?) And, of course, to entertain. To generate tears and laughter.

Or, I write to amuse my friends, and to aggravate — exasperate —ulcerate — our enemies.

The fine art of making enemies: I've become remarkably good at it. Which is probably why reviewers give me such a hard time.

* * * * *

may 15, 1986
tucson

WHITE NOISE:

Religion, self-deception — the compulsion to believe in some form of life after death, without examining what such a disembodied existence could consist of or amount to. Suppose there really is an intelligent Being "out there" — a transcendent God. So what? What good does that do us? Such an answer answers nothing. We are still confronted, God or no God, by the riddle of the universe, the mystery of existence.

Or — a technological effort to prolong life indefinitely? That makes some sense to me. On the whole, I enjoy this earthly career — so much to do, to learn, to enjoy. If it were offered to me, would I refuse an immortality serum? I would not.

However, in the meantime, we are left with the choice between accepting death with some pride and dignity, or groveling in fear and clinging with terror to a medicated survival for as long as possible.

Furthermore, without death, life would lose half its drama. Joy would seem pallid, beauty pale, danger insipid, adventure empty.

Our existence would become merely spiritual — off-white and ghostly. Sort of — idyllic but boring.

All the old rituals of death and birth would become meaningless.

Boredom, in fact, would become the *terror*. I can imagine the most cruel and terrible gladiatorial contests taking place, as a populace sick with *ennui* seeks to recover the thrill of death, the joy of victory.

Madre, madre ... socorro [succor]. Faced with death, the body recoils in fear, in horror, in terror. The body *knows*. The pious pray, but the body *knows*.

Face to face with death. To look death in the face — see it, know it — and then ... to go on. The heroic stoic.

Your turn....

* * * * *

august 18, 1988
tucson

"ONE LIFE AT A TIME, PLEASE" AND "BEST of Abbey" reviewed, sort of, in *NY Review of Books*. That nice young man Bill McKibben done it. Not bad, really, except, like most other book reviewers I've had to endure now for the past twenty years, he seizes on one narrow aspect of my writing (the desert-loving, deep-ecology bit), and ignores the other ninety percent, thus misrepresenting my books and falsifying my life. Should I protest? What's the use? I haven't seen a review of any of my books anywhere yet that I couldn't have written much better myself.

* * * * *

march 2, 1989
tucson
Abbey died twelve days after this, his final entry.

THE HACK'S PROGRESS:

Money money money. Here I sit, bleeding to death (look, Maw!) and the fukkin greasy money keeps pouring in as me tired old body pours out.

* * * * *

WHY BOOK REVIEWERS HATE MY BOOKS:

Because the books are really no good? Perhaps. But I think I've got a better explanation. Almost all reviewers, these days, are members of and adherents to some anxious particular sect or faction. I.e., they are lesbians or New Agers or fem-libbers or (even worse) male fem-libbers or technophiles or self-hating white liberals or right-wing conservatives or Growth maniacs or Negroes or female Negroes or Third-World lesbian militant Negro poetesses or closet Marxists (Marxoids) or futurologists or academical specialists or Chicano idealogues or ballerinas or Kowboy Kultists or Kerouac Kultists or Henry James Minimalist Perfectionists or one-tenth Chippewa "Native American" Indians or at very last and all-inclusive Official Chickenshit Correct-Thinking Liberals etc., etc.

As such, any member of any one of those majority minorities is going to find for certain a few remarks in any of my books that will offend/enrage "s/he" to the marrow, leading inevitably in turn, on the part of such sectarian book reviewers, to a denunciation not merely of the offending passages, but of the *entire book*, and not merely of the book, but of the author too.

* * * * *

UPON MY ARRIVAL AT NYC'S LAGUARDIA Airport:

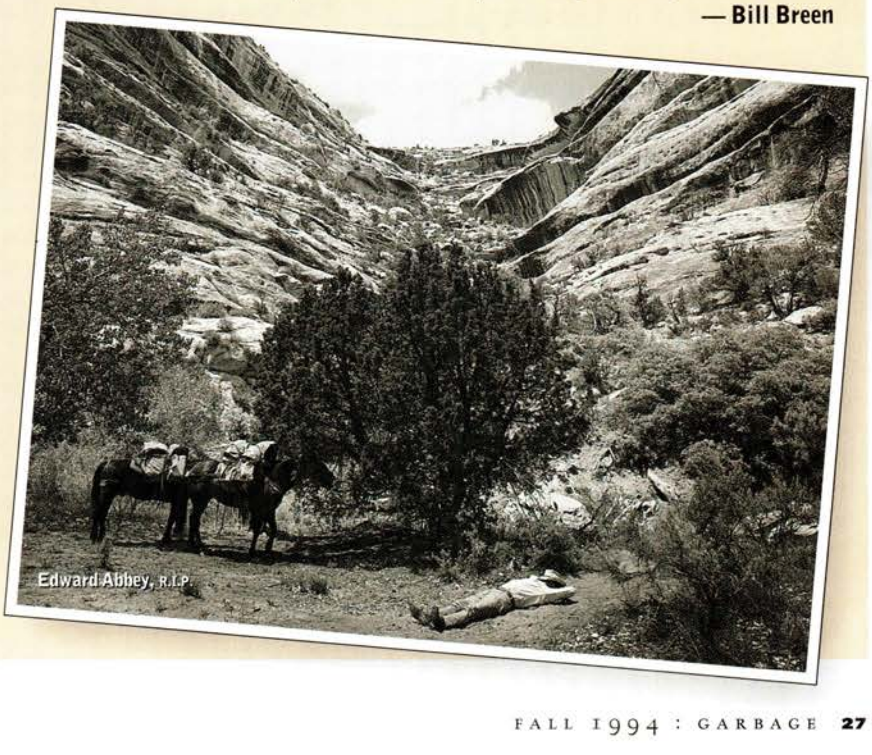
"Where to?" sez the cab driver.

"It's doesn't matter," sez I; "I'm in demand everywhere."

A Gadfly with a Stinger

Edward Abbey's writing life began inauspiciously, with an "F" in a high-school journalism course. In fact, much of the first-half of his career was dogged by rejection. ▪ The farmboy from Home, Pennsylvania may well have been "America's most famous unknown author" when his fourth book, *Desert Solitaire*, was published in 1968. Abbey was 41 years old, and despite some accomplishments in academe (a Fulbright fellowship and a master's degree in philosophy), his life consisted largely of a vagabond series of day jobs: welfare caseworker in Hoboken, N.J., bartender in Taos, school-bus driver in Death Valley. Nights, he hammered out three novels on his manual typewriter. Upon publication, each was pretty much neglected. *Desert Solitaire* seemed destined to suffer the same fate. ▪ Instead, a community of readers slowly discovered this hard-headed, unsentimental meditation on a season of solitude in Utah's slickrock backcountry. Eight years later, he published *The Monkey Wrench Gang* (1975), a bawdy tale of environmental retribution that inspired the environmental group Earth First!. The two books gave Abbey what he most craved — an audience. But he was taken aback by the adulation, and fretted that nature-obsessed readers weren't seeing the art and wordplay for the trees. ▪ "Read my books and you'll discover that only about ten percent of my words are concerned with conservation issues," he said. "The rest is play. Entertainment." ▪ To read his books is to discover a trailblazer, an iconoclast, a "gadfly," observed novelist Wallace Stegner, "with a stinger like a scorpion." There are eight novels and a dozen volumes of nonfiction in all, ranging from *Johnathan Troy* (1954) to *Hayduke Lives!*, a sequel to *The Monkey Wrench Gang* published posthumously in 1990. Friend and fellow writer David Petersen deems Abbey "a master of descriptive prose who wrote with symphonic eloquence of his beloved West and its denizens." Essayist David Quammen judges his entire oeuvre "pretty damn good." Many agree *Desert Solitaire* is a classic of American Western literature that will endure. ▪ Contemplating his own mortality, Abbey declared in a journal entry that "the earth has fed me for half a century; I owe the earth a meal — that is, my body." He died after a lengthy battle with cancer at age 62, on March 14, 1989. In accordance with his wishes, he was buried in an unmarked grave in the desert wilderness — a "final camp site," writes Petersen, "offering an Abbey kind of view."

— Bill Breen



MARK KLETT

Dave Foreman is thinking about Dan Quayle. The co-founder of Earth First! and icon of the environmental left is about to leave his home in Arizona to go whitewater rafting in Utah. You'd think he'd have more pastoral thoughts on his mind. But no. Foreman is thinking about Quayle, chairman of George Bush's Council on Competitiveness and crown prince of environmental deregulation. Bush's "Drug Czar" William Bennett, Quayle's comrade in conservatism, is also on Foreman's mind. "We need to listen to what people like Dan Quayle and William Bennett are saying," Foreman responds, when asked why people across the country are rising up against the environmental movement. "There really is a crisis of values in this country, and it really is incumbent on the conservation community to talk about it, to talk about restraint instead of excess, to talk about humility instead of arrogance," Foreman says. "But the community is afraid to, because I think it is uncomfortable talking about values. We leave it to the preachers, the Rush Limbaughs of the world, at a time when the American public wants answers, wants values, wants to know how to become a better people." Environmentalists, uneasy talking about values? How so, when its values have always seemed so clear? "The community right now is in a very difficult position, groping around, trying to articulate what it is for," Foreman continues. "It has forgotten how to do certain things, like grassroots organizing, which the Wise Use movement has learned to do very well. And it got spoiled, having the anti-christ in [Reagan's Interior Secretary James] Watt and others to organize against. It was so easy then." Foreman then left for Utah. But his point resonates. Environmentalists are bemoaning a "backlash" against their work. They say the signs are everywhere, from the barrage of

what the hell are we fighting

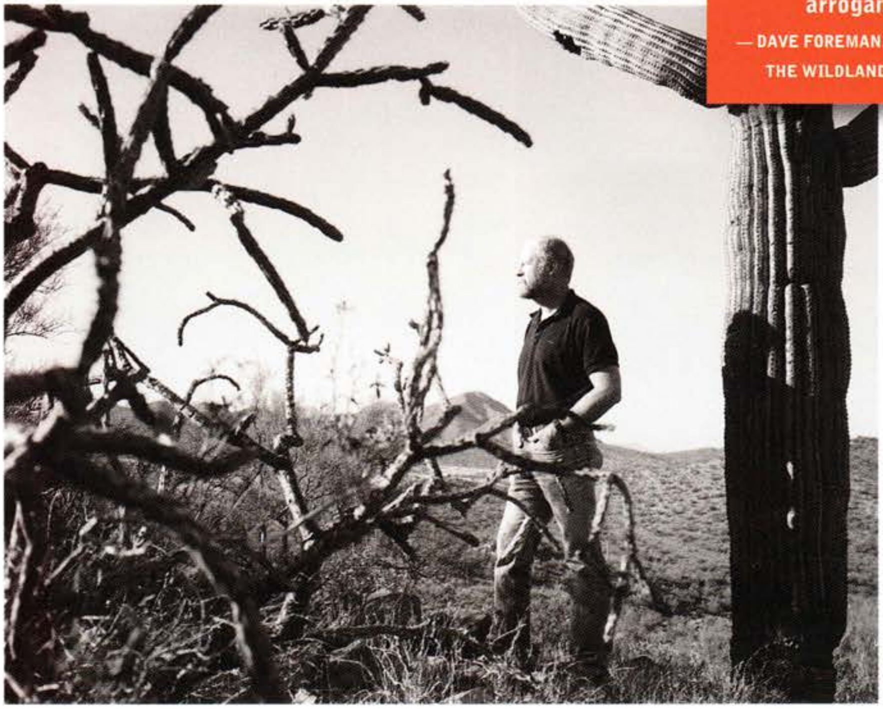
crying "backlash," an embattled movement struggles to articulate a vision of sustainable environmentalism for the future. **by robert braile**

illustrations by gordon studer

for

"unholy trinity" amendments on Capitol Hill that would weaken some of America's premier environmental laws, to the wave of industry advertisements that make polluters look like Thoreau, to the outpouring of newspaper and magazine articles that have challenged environmental totems.

But if there is a backlash, why are environmentalists floundering in their response? If Americans are yearning for values, for moral and ethical vision, why is it that the best the environmental movement can offer is the obvious: "We stand for clean air, land, and water"? If Americans, as Ross Perot proved in 1992, want to know how everyday people can make an empowered, proactive difference in the world, why is it that the environmentalists who are most in touch with everyday people — the grassroots environmentalist — are pulling away from the big national groups, thus fracturing the movement?



MARK KLETT/SWANSTOCK

And if for various reasons Americans do not perceive a clear and immediate environmental threat (whether one exists or not), why do environmentalists insist on breathlessly characterizing their critics as mortal enemies strategizing to undermine decades of environmental progress? And what of that progress? Why do environmental success stories seem to befuddle the movement, rather than embolden it?

If Foreman is right, the environmental movement — so adept for so long at defining itself in terms of what it is against — is for the first time in decades being forced to define itself in terms of what it is for. It is not coming easily, this advocacy without a counterpoint. And it is opening the door to a new school of critics, who have little trouble telling you where they stand, who more deeply register with everyday people, and who better fill the values void.

> **"There really is a crisis of values in this country, and it really is incumbent on the conservation community to talk about it, to talk about restraint instead of excess, to talk about humility instead of arrogance."**
>
> — DAVE FOREMAN, CHAIRMAN OF THE WILDLANDS PROJECT

Getting Harder to Scare People

THE TIMES HAVE CHANGED, AND WITH THEM our perception of the environment. These are not the 1960s and 1970s, when Ohio's Cuyahoga River burst into flames, when the air was laced with lead, when everyday people actually worried about the planet's health. Nor is it the 1980s, when environmentalists convincingly cast Reagan and Bush as the political equivalent of those problems. By 1988, high-profile media coverage of the Mobro garbage barge's odyssey, global warming, and other issues prompted a conservative Texas Republican, George Bush, to stand ankle deep in the trash of Boston Harbor and declare that he wanted to be the environmental President, a pronouncement that seems unimaginable for any presidential candidate to make now.

Serious environmental problems persist, of course. Few would dispute that. Yet even when those problems are dramatic — such as last year's contaminated drinking water incident in Milwaukee, where 100 people died and 400,000 fell ill — they still fail to register in the national imagination as crises. Perhaps there are fewer problems. Maybe they are more obscure, more insidious. But for environmentalists, so entrenched in crisis, so wary of letting their guard down, this sense of a world without problems has itself become a problem.

"The leadership of the national environmental community grew up in an era when the enemies were easily visible, and the way to respond was to develop a certain set of facts, a certain set of data, and to attack," says Keith Schneider, an environmental correspondent at the *New York Times*, and one of the journalists often maligned by environmentalists.

"And [it] worked," Schneider continues. "Water was dirty in the Hudson River, and the way to deal with it was to place controls on polluters and demonize the big corporations as the scourge of the world. But in the '90s, it's harder to demonize corporations, harder to demonize government, harder basically to scare people. We have more data on what the risks really are, and with 25 years of experience on what works and what doesn't, we know more about how to solve problems. So this hyperbolic approach doesn't resonate the way it used to, and the national environmental community is now searching at the very top levels for a new sort of strategy. And they haven't figured it out yet."

Mike Bader, the executive director of the Montana grassroots group Alliance for the Wild Rockies, put it more succinctly. The environmental movement, too accustomed to working reactively, and too befuddled by having nothing to react against, "simply lacks a clear and coherent vision of what it wants to do."

Stolen Rhetoric

THE POLITICAL LANDSCAPE INSIDE WASHington's Beltway over the past two years suggests that the national environmental groups have become their own worst enemy, primarily in miscalculating President Bill Clinton's promises. (See "Enviros Scramble to Save Existing Laws," p. 34.) At the very least, they have been battered. They conceded as much in July, when luminaries from 15 of the largest organizations took the unprecedented step of issuing a "single call to action to our combined memberships." In a joint letter, Greenpeace, the National Audubon Society, the Sierra Club, and other groups declared that environmental laws such as the Clean Water Act and Superfund "need to be strengthened.... But incredibly, Congress is poised to weaken them instead." The blame, according to the letter, falls to lobbyists and special interest groups.

But far more has been at work here than some dashed hopes and strategic fumbling on Capitol Hill. Environmentalists have missed the point — winning legislative battles on the Hill is not enough. It may even be counterproductive, depending on the law. Vision, the kind that matters to people from Maine to New Mexico, the kind Foreman and Bader are talking about, is also needed. And it is not forthcoming.

CHRISTOPHER HARTLOVE

"I don't think we're having any difficulty determining what we stand for, but we are having difficulty determining how to fight for what we stand for."

— ERIC OLSON, SENIOR ATTORNEY AT THE NATURAL RESOURCES DEFENSE COUNCIL

Environmentalists readily concede that their expectations of the former Arkansas governor have gotten them into trouble. After 12 years of Reagan and Bush, they would have welcomed any change. Clinton represented such a change, and for the better. Here was a President who chose as his running mate Tennessee Senator Al Gore, a prominent environmentalist, author of *Earth in the Balance*, and an eloquent spokesman for their cause. Here was a President who pledged to work with a Congress still controlled by his own party to right the wrongs — to elevate the EPA to the Cabinet, to save the Everglades, to protect the ancient forests.

That promise, environmentalists say, has had two countervailing effects: It has propelled an already surging Wise Use crusade (a coalition of ranchers, loggers, miners, and anti-environmentalists) into national prominence, and it has lulled an already struggling environmental movement to sleep. "One reason the backlash has been able to make inroads is that there is this perception that we have an environmentally friendly Administration," says Eric Olson, senior attorney at the Natural Resources Defense Council. Then again, "We did have very high expectations, and to some extent, we let our guard down."

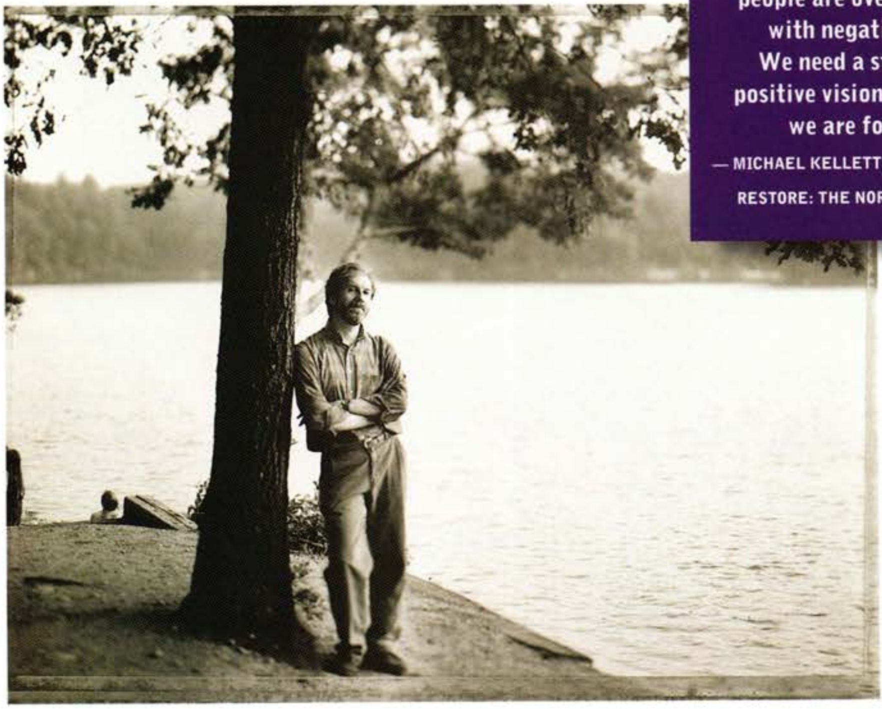
The problem is one of strategy, not vision, Olson insists. "I don't think we're having any difficulty determining what we stand for, but we are having difficulty determining how to fight for what we stand for. For 12 years, we were shut out and just threw stones. The question now is, if we have some friendly signals coming from the Administration, what should we do? This has caused some confusion on what our strategy should be."

Adding to that confusion is a tactical shift by the opposition, says John Echeverria, counsel to the National Audubon Society. In essence, rather than try to beat environmentalists, industry has claimed to join them. In ad after ad over the past year especially, industry has attempted to convince the American public that it, too, cares about the planet. Such PR has left the national environmental groups flat-footed, neutralizing the clear and present danger that they have long relied on to focus and define their mission.

Some companies have improved their track records, Echeverria notes. "But for the most part, they continue to clearcut, they continue to pollute, and they have adopted a public relations posture that suggests their practices are better for the environment than they actually are. It is greenwash, a disguise, that then allows these same opponents of environmental legislation to undermine the laws without appearing to do so, because instead of talking about whether the goals of the legislation are worthy, they frame the issue in terms of costs and benefits for local governments and property owners, and the general notion that government is spending great volumes of money with little sense."

The opposition has also learned all too well from environmentalists themselves how to cultivate and shape public opinion. Wise Use activists are tapping the pro-jobs, anti-government mood in the country, cashing in on the fact that environmentalists "don't pay enough attention to Joe Sixpack and Betty Bowling Ball," says Chris Ballantyne, northeast regional director of the Sierra Club.

> "There may be as many or more problems now than ever, but people are overloaded with negativity. We need a strong, positive vision of what we are for."
> — MICHAEL KELLETT, FOUNDER OF RESTORE: THE NORTH WOODS



WILLIAM HUBER

They are delving into grassroots America, forging constituencies among everyday people who are ready, willing, and able to write letters to their congressmen, storm public hearings, and stage media events. Major corporations are doing the same in their newspaper and television ads, recognizing that even the highest paid lobbyists are more powerful with public opinion on their side.

"They are basically using our techniques, and doing a better job with them than we are," says Debbie Sease, the Sierra Club's legislative director. "And now we have a tremendous problem. We have to go out, reach the public and get them to understand that they don't want to throw out good environmental legislation with government itself."

Ironically, then, the environmental movement is struggling with a "vision thing" because of a pervasive sense — the movement would call it an illusion — that its vision has become a reality: The environment is not in danger. "Without thick particles of dirt filling the air, without rivers bursting into flames, the issue is much more difficult to perceive," said Philip Shabecoff, a former Washington correspondent for the *New York Times*, and currently executive publisher of Greenwire, a daily environmental news service. "This is especially true with an issue like global warming, which you not only cannot see, but which will not affect the Earth for decades. How, then, do you get people to make sacrifices? This is a much more difficult situation for environmentalists, and there's no question it's one of the things they're struggling with."

But Shabecoff would be among the first to agree that this challenge — to articulate a vision for sustainable environmentalism — cannot be solved by issuing a joint call to arms and a few apocalyptic press releases. Environmentalism is crying out for a new philosophy, one that looks beyond the Beltway to embrace the broader social currents at work.

The odd thing is that environmentalists understand their quandary, yet they seem frozen when it comes to doing something about it. They even seem to find comfort, rather than cause for action, in contemplating the currents. They perceive, for instance, that critics are rising up against other social movements identified with liberalism. Writers like Camille Paglia and Shelby Steele are challenging the feminist and civil rights movements, respectively. Both are at the same crossroads as the environmental movement, struggling to define themselves when their enemies are no longer as apparent, and their problems are no longer as clear. In discussing the rift in the civil rights movement that surfaced in the 85th annual convention of the NAACP in July, Don Terry of the *New York Times* reported that "the Jim Crow laws and lynch mobs that made unity easier and clearer 30 years ago are gone."

"You can see this type of thing happening in a lot of social movements," Olson says. "In the beginning, there is a tremendous explosion of response from Congress, the problems are seen as easy to fix, and some solutions come quickly. But then as the problems get more complex, the opposition steps in. That's where we are now."

Burdened by Success

OLSON MAY BE RIGHT — THE PROBLEMS MAY be more complex. But there may also be fewer of them around, and perhaps even some success stories to tell. Some observers, especially those in the press, argue that environmentalists are unwilling to acknowledge their successes, as well as where they are contradicting themselves. In failing to do so, they have created perhaps their most formidable obstacle to defining a vision and a new set of values.

Schneider, of the *New York Times*, and Gregg Easterbrook, a contributing editor at *The Atlantic* and *Newsweek*, have been attacked by environmentalists for writing articles that challenge everything from the dangers of dioxin to the dearth of spotted owls in the Pacific Northwest. They and, increasingly, other reporters are challenging environmental orthodoxy. As Foreman says, the media "has gotten a lot more skeptical of environmental claims. GARBAGE is a perfect example. In a few cases, environmentalists have overstated the concerns, sure. But a certain type of personality is drawn to journalism. While the environment was apple pie for years, now it's okay for people like Schneider and Easterbrook to poke fun at us. And let's face it, the way they make names for themselves is by writing a different kind of story."

Some journalists agree. For two decades, Shabecoff's work defined a more advocacy-oriented school of environmental journalism. He takes issue with the new school. "Schneider is practicing journalism, but he's practicing bad journalism," he says. "I don't think he's an ideologue, though. Easterbrook, on the other hand, is so consistently on the other side that he's got to have an agenda."

"Companies continue to pollute, and they have adopted a public relations posture that suggests their practices are better for the environment than they actually are."

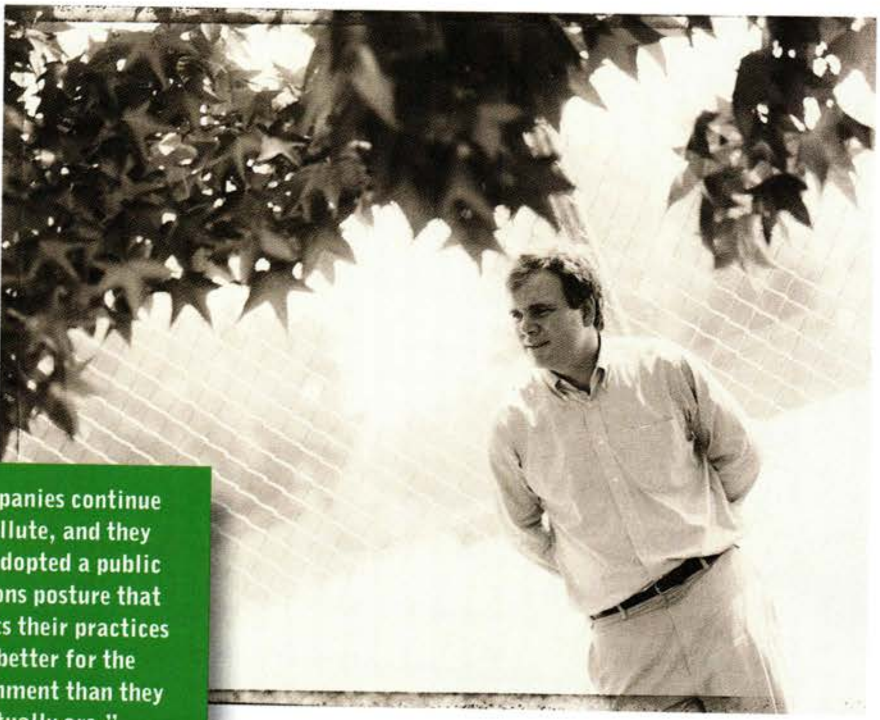
— JOHN ECHEVERRIA, COUNSEL TO THE NATIONAL AUDUBON SOCIETY

But Schneider, who wrote for environmental magazines before joining the *Times* in 1985, thinks the criticism amounts to a glorified version of shooting the messenger. The press is finally coming to grips with a complex beat, is starting to look beyond environmental groups for sources, and is beginning to discriminate between good policies and bad. By "demonizing" all who disagree with them, environmentalists are misleading their followers and hurting themselves, he says.

"By trying to portray others as enemies, and by failing to understand the cultural shifts in understanding in the U.S., the national environmentalists have become an enemy of the very programs, policies, and laws they themselves espouse," he says.

The Beltway "ecochamber" is producing or defending flawed environmental laws, and those flaws are becoming apparent in the field, he adds. With that, the wedge is sinking deeper between the rural grassroots groups that feel the brunt of those laws, and the urban national groups that champion them. As the gap widens, Congress senses a house divided, making it easier to take up the Wise Use and industry agenda.

At the risk of sounding NIMBY-esque, Schneider turns to his own backyard for an example. About 20 miles north of his farm in Michigan, in a 135-acre meadow on the Betsi River, a Connecticut company has built a $25 million incinerator. For years, trash in the area was dumped in small, unlined landfills. But under the requirements of the federal Resource, Conservation, and Recovery Act, those landfills — "which weren't leaking in the first place" — were closed. Disposal costs have skyrocketed, recycling has been curtailed, a meadow and nearby forest have been bulldozed, and an out-of-state company has gained a monopoly on the county's trash.



CHRISTOPHER HARTLOVE

"The point is that right now, American environmental policy set in Washington is putting this landscape at risk," Schneider says. "The solid-waste-management policies that the national environmental community is desperately seeking to protect from weakening are the same policies that are putting the people in my county, Leelanau County, Michigan, at risk."

Easterbrook, whose cover story in the March 28 issue of *The New Republic* argued there are more spotted owls in the Pacific Northwest than environmentalists' claim, agrees. Environmentalists grew accustomed in the 1980s to journalists like Shabecoff, "stenographers for the environmental movement," as he puts it. The movement is now part of the establishment, which in the post-Watergate era of journalism means it must face the same skepticism that all social institutions encounter. And in refusing to concede that the environment is improving, the national groups are making "a drastic blunder politically," he says.

"Anyone who relies on exaggeration to exist politically runs the risk that their bluff will be called," says Easterbrook. "And so my biggest concern with the continued reliance on doomsday rhetoric is that they will blow their position politically." Yet environmentalists still insist on having an enemy — whether there is one or not. "If NASA called a press conference today to say it had recalibrated its satellites and found there is no ozone problem, a lot of environmentalists would be heartbroken."

Environmentalists, "more than anything else, need to have some cold water dropped on their heads," continues Easterbrook. "They need to become more rational."

Mainstream Groups "Cannot Hold"

RATIONALITY IS IN THE EYE OF THE BEHOLDer. And the beholder for the moment is a culture searching for ways of becoming "a better people," as Foreman says. Environmentalists are not providing an answer. "We've run out of vision," Foreman argues. "We're only trying to protect the status quo. By emphasizing our opposition to people like Watt, we really did forget how to put out a proactive vision."

The national environmental groups, especially, have failed to articulate such a vision. They admit to being out of touch with their grassroots counterparts, who by necessity are more focused on issues that directly affect them, and therefore more inclined to push for concrete solutions. Could the grassroots fill the values void better than the mainstreams? In doing so, would they strengthen or weaken the movement? As Brock Evans, vice president for national issues at the National Audubon Society, notes, the national groups "are being savaged from the left and right — the Wide Abuse people [as he calls them] are attacking us for being too tough, and our own people on the left are attacking us for not being tough enough. And the center cannot hold."

Michael Kellett quit a mainstream powerhouse, The Wilderness Society, two years ago to form a grassroots group, RESTORE: The North Woods. It is based in Concord, Massachusetts, just down the road from Walden Pond. And it has turned the New England environmental community on its ear, including the regional offices of many national groups. RESTORE has called for repopulating the eastern timber wolf in the region; petitioned the federal government to list the Atlantic salmon as an endangered species; appealed virtually every timber sale in the

Enviros Scramble to Save Existing Laws

Environmental legislation has hardly been a top priority for Congress and Clinton. This should be no news to environmentalists, who might have realized early on that "the environment, to Bill Clinton, is what he jogs through to get from the White House to McDonalds, " as Dave Foreman, chairman of the Wildlands Project, put it.

Sure, Clinton held a timber summit in the Pacific Northwest; he signed the Biodiversity Treaty; he backed an energy tax, as well as reforms to grazing, mining, and logging practices on public lands. He even gave EPA Administrator Carol Browner a seat at Cabinet meetings. There was talk at the start of the 103rd Congress of strengthening the Clean Water Act, Endangered Species Act, Safe Drinking Water Act, and more.

But Clinton also backed the North American Free Trade Agreement, further dividing mainstream and grassroots environmentalists. He abandoned the public lands reforms to secure the votes he needed from a bloc of Western Democratic senators to pass NAFTA, promising executive orders or legislation on the issue. Neither has happened. Gore okayed a test burn at the East Liverpool, Ohio, hazardous-waste incinerator, angering local grassroots groups. Browner announced a reevaluation of the Delaney Clause, which bans certain pesticide residues on foods. Interior Secretary Bruce Babbitt ousted Jim Baca, the progressive head of the Bureau of Land Management.

Gradually, "the light at the end of the tunnel was turning out to be another tunnel, " says Philip Shabecoff, formerly a Washington correspondent for the *New York Times*, and now the executive publisher of Greenwire, an environmental news service. But only gradually. Clinton still seemed green enough to keep at least the mainstreams happy, and to make the backlashers nervous, perpetuating the view that environmentally, "it is morning again, " as Foreman says.

Why should Clinton do more? "With Al Gore as Vice President, there is this perception that everything that can reasonably be done, will be done, " says John Echeverria, counsel to the National Audubon Society. "The public thinks this Administration has significantly changed the course of the federal government on environmental issues, and so there is no political incentive for the Administration to actually take steps to protect the environment. [After all], Al Gore wrote the book."

As word has spread on Capitol Hill over the past two years that the White House is not interested in investing political stock in the environment, it has become easier for Congress to back Wise Use and industry interests — especially since those interests have refashioned their pitch. With polls showing broad support for environmental protection even if it impedes economic development, the backlashers have dropped — at least rhetorically — their attacks against environmentalists.

Instead, taking their cue from the surging populism that propelled Ross Perot in 1992, they have recast their agenda with the middle class in mind — arguing for risk assessments and cost/benefit analyses, so we know what a law will do and whether it is worth the price; pushing to

Green Mountain and White Mountain National Forests (and even won a few cases); lambasted the U.S. Forest Service for losing money on timber sales and violating its forest plan in the Whites; and proposed a 3.5-million-acre national park in Maine.

One environmental magazine, *Outside*, suggested in its March issue that RESTORE and other grassroots groups might represent the wave of the future for American environmentalism. It cited RESTORE as one of the eight top grassroots groups in the country, part of "an evolution in the revolution" that has given new meaning to the notion that "smaller might be bigger."

Kellett started RESTORE "because, number one, I didn't believe there was enough of a grassroots movement in the region that involved all of the people who are out there and concerned, but who don't know what to do to protect the environment. Number two, I felt that for the most part, other groups in the Northeast are interested in focusing only on protecting what's there now, and not on restoring the ecological integrity of the region. I felt a group was needed to promote in a visionary manner the restoration of that integrity."

While the national groups have lost touch with Joe Sixpack and Betty Bowling Ball, the grassroots groups are listening to them, and shaping a vision around what they hear. "People are getting numb to crisis," he says. "There may be as many or more problems now than ever, but people are overloaded with negativity. They see clearcutting in the ancient forests, and say 'here we go again.' They see the Exxon oil spill in Prince William Sound, and say 'here we go again.' We're living in a time when people feel hopeless about doing anything about these things. The problems seem to get worse and worse, so why even try?"

Kellett thought about what he had said, and then proposed an antidote: "a strong, positive vision of what we are for. That's what people respond to ... and that's what the grassroots are really good for. They are very focused on particular problems, and they are trying to create fundamental change. Ross Perot gave the impression he was for empowering people, and that's how he got so far. It may have been an illusion, but people responded to it. And that's because he gave people what they wanted to hear — we can do this, we can make a change, there is a solution."

prevent "takings" by the federal government, so private property rights will be protected; lobbying to end "unfunded mandates," so the federal government will pay for the laws and regulations it imposes on states. Environmentalists have branded these initiatives the "unholy trinity" — "pure and simple, an overt and calculated attack on the environment," Sierra Club executive director Carl Pope wrote in a March 25 letter to Congress.

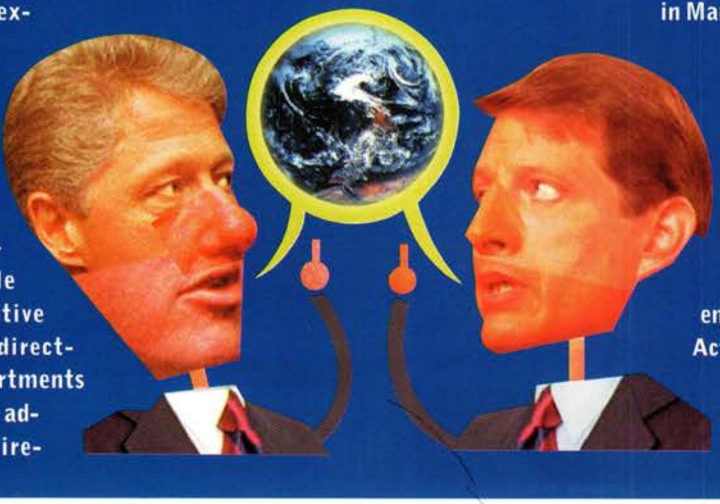
So far, the "regulatory relief" agenda has worked, attaching crippling amendments to major environmental bills, and forcing strategists for the national environmental groups to back off. "We are slowing down on some of our agenda because it is just too risky to reauthorize the Endangered Species Act, for example, with all these amendments locked into it," says Brock Evans, vice president for national issues at the National Audubon Society.

The White House has made gestures of compromise. Mr. Clinton signed an executive order last year, directing agencies and departments to consider the costs and benefits to state and local governments of federal requirements. He signed another executive order, also last year, directing agencies and departments to assess the risks to be addressed by such requirements. He authorized a $200,000 study of unfunded mandates, due next year. Yet, despite the olive branch, scores of unholy trinity bills are in the works.

A bill to elevate the EPA to the Cabinet has died. A risk assessment amendment sponsored by Sen. Bennett Johnston (D-Louisiana) was attached last year by the Senate with near unanimous approval; the House voted this year not to consider a Cabinet bill unless similar amendments were debated. House leaders pulled the measure. In doing so, the House "sent an unmistakable signal that every major piece of environmental legislation to come before Congress this year will have to run a gauntlet of provisions intended to lighten the burden of regulations on industries, private property owners and state and local governments," the *New York Times* reported on February 7th.

In a quote that has made the rounds, Jim Maddy, President of the League of Conservation Voters, told the *Times* in March that "the best we can do is prevent this Congress from weakening the Clean Water Act, prevent this Congress from weakening Superfund, prevent this Congress from weakening the Safe Drinking Water Act and prevent this Congress from weakening the Endangered Species Act."

By May 2nd, more than 30 unfunded-mandate bills alone were in the works.



Vilified by his enemies and even environmentalists — his putative friends — Interior Secretary **bruce babbitt** is forging a new kind of pragmatic environmentalism. Perhaps the heat he takes from both sides is a sign that he's on the right track.

by bill gifford

the view from the citadel

BRUCE BABBITT, SECRETARY OF THE INTERIOR DEPARTMENT, IS GETTING BLUDGEONED again — by his enemies, for a change. Shortly after ten on an April morning, eight Western members of the Senate Committee on Energy and Natural Resources await their turn to rip Babbitt's latest grazing reform proposal. ▪ Just now, the ornery Sen. Malcolm Wallop (R-Wyoming) is swatting Babbitt with the words of his very own uncle. "Our overriding concern for the ranch's future is the impact of extremists," wrote John G. Babbitt, in the preface to a book about the Babbitt family's famous CO Bar ranch. "People who, in the name of conservation and range management, would drive us out of business." ▪ Why, Wallop wonders, would Babbitt want to do that?

photograph by daniel arsenault

Highway 27
Mahogany Hammock
Gumbo Limbo Trail
Anhinga Trail
Cape Sable
Mangrove Trail
Visitor Center
Florida Bay

The century-old range war has never raged hotter. As usual, the issue boils down to the fees charged to cattle and sheep ranchers to graze on federal lands — currently about one-fifth the fees for private grazing. The Senators thought they'd trumped grazing reform last spring after the President traded it out of his budget for NAFTA votes. But Babbitt's brought it back three times.

Although he's softened the rules on grazing reform to defuse the Senators' objections, to them, it's all or nothing: Fees for grazing on federally owned lands will be raised only over their dead, cowboy-booted bodies. But his proposal also displeased the grazing reformers in Congress and the Washington environmental groups, who'd lobbied hard to get Babbitt appointed. In March, House Interior Committee chair George Miller (R-Calif.) and three of Babbitt's strongest allies sent him a dire letter: toughen up the rules, or kiss the rest of your agenda, including the crucial rewrite of the 1872 mining law, goodbye.

DANIEL PORTNOY/AP

Babbitt's is the hardest sell in American politics. In an age

It's a classic Babbitt performance, in which he manages to annoy both sides while clinging to some vision of compromise known only to himself. "You can assail me forever, and I will grind you down with reason," he says.

It worked back when he was governor of Arizona. Mediating between the interests of cities, farmers, and the mining industry, Babbitt rammed through a massive rewrite of the state's water-quality law in the early 1980s. While he compromised with the Republican-dominated Legislature, he rarely shrank from speaking his mind. Pushing for state grazing reforms, he called subsidy-dependent ranchers "greedy people."

He's no longer the governor of a one-area-code state, a circumstance he shares with his boss. It remains to be seen whether his reasonable but resolute approach can work at Interior, which spits out Secretaries at a rate of one every two years.

Babbitt is not the crusader that some environmentalists believed he was. Then again, neither is he James Watt in a leprechaun suit. He hasn't turned around Western land management policy in his 18 months in office, but he *has* achieved things that would have been considered huge victories three years ago. He has used the office to test the system — with little help from his friends. In the process, he's forging a pragmatic environmentalism that prefers concrete results to stalemate.

Greens Love Him, And Leave Him

BABBBITT DIDN'T WANT TO BE INTERIOR Secretary. Just days after Clinton's election in November 1992, he declared the agency "a mess." His predecessor, the unassuming Manuel Lujan, compared Interior to "a sack of clawing cats."

"No one is satisfied," Lujan told a reporter upon his return home to Albuquerque. "If you do something pro-development, you get the environmental groups against you, and if you do something pro-environmental, you get the industry groups against you."

For someone like Babbitt, the conflicts are compounded. When the Clinton Administration was staffing up, his name was floated for Energy or U.S. Trade Representative, but a lobbying blitz by the greens got him installed at Interior. Babbitt had wowed the environmental community at the Sierra Club's annual dinner in 1985, where he'd called for public use as the dominant use of federal lands. More recently, he'd served as the $2-a-year president of the League of Conservation Voters, whose political donations doubled on his watch.

To the Western Senators and their allies in the "wise use" movement, Babbitt is the architect of the administration's "War on the West" — his chief armament being the push for grazing and mining reform. Yet he has proved a disappointment to enviros. "He's not quite the hero he used to be," says Ben Beach, spokesman for the Wilderness Society. Whenever Babbitt ventures into the Northwest or Florida, enviro picketers compete with farmers and loggers to vilify him.

So it has always been. The Bruce Babbitt who ruminated with the late Edward Abbey atop fire towers is the same guy Abbey later christened "Babbitt the Rabbit" for toadying to developers. The Bruce Babbitt who urged environmentalists "not to head for Washington to be part of the establishment," but instead to be the "barbarians in the hills, laying siege to the citadel of power," now finds himself raising the drawbridge and boiling the oil.

Interior's headquarters rather resembles a citadel. The Stalinist edifice, occupying a large city block southwest of the White House, bespeaks bureaucratic inertia and internal conflict. "The conflicts are built into the statutes," he says. "The place is stacked with mandates that say 'use natural resources.' Then you turn around, and other statutes seem to say 'create national parks, advocate for wilderness areas, protect natural areas at all costs, and enforce the Endangered Species Act'."

For more than a dozen years, the second half of the list was neglected.

The place was run by what University of Colorado law professor Charles Wilkinson calls the "Lords of Yesterday": the timber, mining, and ranching interests, and the history and traditions they represent.

Almost as soon as he hit town, Babbitt launched several major initiatives aimed at correcting the imbalance. Each followed the same pattern as grazing: the Lords of Yesterday yowled, and Babbitt backed off, a little. The conventional view is that he has squandered his chance to reform Interior, caving in on grazing and almost every other issue that's crossed his desk. Yet he has always gotten some of what the enviros wanted, sometimes more. Not only did he tease out a settlement to the Everglades legal morass, but he has actually expanded the Endangered Species Act in the guise of softening it. He established the National Biological Survey, saw the California desert bill passed, and halted the Bush administration's fast-track approval of mining claims — all items on the Sierra Club's election-year wish list. Which is why barbs from environmentalists frustrate Babbitt.

ndamentalism, he's put all his chips on the middle ground.

Talk Tough, Then Deal

HE HAS NEVER ADHERED TO ORTHODOXY. As governor, Babbitt often told Arizona environmentalists to get stuffed. The Bruce Babbitt who enacted his state's first water-quality law, aimed at major polluters like Motorola, later enlisted the electronics maker as a client. In one of the League of Conservation Voters' annual scorecards, he wrote, "We must identify our enemies and drive them into oblivion." As Interior Secretary, he spends time patiently listening to these same enemies, many of whom would like to drive *him* into oblivion.

Babbitt's style was aptly described by Richard Snell, CEO of Pinnacle West Capital, which operates nuclear power plants in Arizona.

"He can be a forceful advocate of a viewpoint," Snell wrote the Senate Energy and Natural Resources committee at the time of Babbitt's confirmation, "but, when in a position of authority to make a final determination, is quite capable of listening well to all sides and making a reasonable, informed decision."

In other words, Babbitt sometimes talks tough, but he'll always deal. The driving force behind Babbitt's dealmaking is said to be Tom Collier, his powerful chief of staff, former law partner, and target of environmentalist complaints. It was Collier who threatened enviros with release of timber in spotted-owl habitat if they didn't go along with Babbitt's plan for the Northwest forests.

"[Collier] has a basic contempt for us," says one veteran Washington enviro. "He thinks we can't deliver, politically, and we can be screwed and hosed on everything." Jim Baca, the ousted chief of the Bureau of Land Management, calls Collier "Machiavellian."

Collier is the one who gets his boss to focus on an issue long enough to close a deal. "He doesn't have an environmental bone in his body," says the legislative director of a major enviro group. Executive director Fred Krupp, of the Environmental Defense Fund, also known to cut a deal or two, wonders whether Interior isn't too quick to compromise. "If we're splitting the baby in half," he says, "we're making a big mistake."

JOHN DURICKA/AP

Chasing Consensus

WHEN BABBITT ARRIVED AT INTERIOR, HE stayed put for six months to get the hang of the place and set his agenda. Then he hit the road, traveling four days of every seven to visit parks, hike trails, raft rivers, make speeches, and listen — not only to environmentalists, but also to ranchers, loggers, and small landowners in the path of the Endangered Species Act. (He's done so much listening that his right ear is quite literally bent.)

Hearing Colorado ranchers in meetings last fall, he says, convinced him to create local grazing councils comprised of ranchers, public officials, and environmentalists, who would administer his new grazing rules. Babbitt borrowed this notion from Western environmental historian Donald Worster, who compared grazing management schemes throughout history and concluded that the systems that worked best were those run by the people who relied on the land (as in Swiss mountain villages).

"Management of the commons only works when there is local buy-in and participation," says Babbitt.

Environmentalists were outraged. To them, local control means domination by the local extractor, be it a ranch, a paper company, or a copper mine. Meanwhile, the Western senators fretted that Beltway greens would be telling Wyoming ranchers where to pasture their cows.

Touting hands-on management is a key to Babbitt's environmentalism. He articulates a general solution, then leaves the details up to the locals. He has done this not only with grazing, but in the Florida Everglades and in several cases involving the Endangered Species Act.

When Babbitt took office in January 1993, the Everglades were entangled in a massive federal lawsuit. The state, the federal government, the regional water management authority, environmentalists, and sugar, the dominant local agribusiness, were deadlocked over who should pay to clean up agricultural pollution of the Everglades. The federal government had sued the sugar growers, alleging that phosphorus-rich runoff from cane fields south of Lake Okeechobee was upsetting the water chemistry and hence the flora and fauna of Everglades National Park. The growers hired enough of South Florida's legal talent to file 36 countersuits, too much for any judge to unravel. By the time Babbitt arrived, the impasse was already three years old.

The deal Babbitt negotiated reeked of cane juice. In the spring, the powerful Fanjul sugar family presented him with an offer to settle the case. In July, he and the Fanjuls announced a "Statement of Principles" for reducing phosphorus pollution of the Glades. "Now what is good for the environment can also be good for business," declared Alfonso Fanjul, whose family raised and donated more than $200,000 to the Clinton campaign. By December, negotiations had foundered amid mutual accusations of bad faith. It looked as though the deal was off, but in January, Babbitt announced a settlement with Flo-Sun, the Fanjuls' company.

Ultimately, the whole thing landed in the Florida Legislature. "An absolutely wretched forum," says David Guest of the Sierra Legal Defense Fund, the lead enviro lobbyist on the Everglades. Interior didn't offer any draft legislation, so the sugar industry ended up writing the bill. What emerged from that legislative sausage grinder last May was a signed-and-sealed deal almost universally condemned in the enviro community as the epitaph for the Everglades.

But wait. The real surprise is that the bill is as *good* as it is, given the circumstance of its birth. The bill requires the sugar growers to cut their phosphorus pollution to 10 parts per billion (from a current 50 or more) by 2003, and to pay a total of $240 million over the next decade toward Everglades restoration. Three years ago, local environmentalists were prepared to settle for one-sixth as much. "We got 100 cents on the dollar of what we sued for," says Guest. The bill clears the way for the next stage, a massive engineering effort to restore some semblance of the original hydraulics of the "River of Grass." Next year's Interior budget request includes some $57 million in restoration funds.

After Babbitt signed with the Fanjuls, however, his green support began eroding: Enviros believed he'd sold out to Big Sugar. The greens also bickered among themselves; some accepted the compromise, others rejected it out of hand, fearing that a partial solution would remove any sense of urgency about the Glades. The leftmost wing of the greens loudly decried a $10-per-house property-tax surcharge to finance the rest of the $450 million cleanup — perhaps the first recorded instance of environmentalists opposing a tax for ecological restoration.

WILFREDO LEE/AP

Enviros don't know what to make of Babbitt's Florida Everglades settlement. It doesn't look like a solution, but it sure doesn't look like a crisis anymore, either.

South Florida is a microcosm for the national environmental scene, and such tensions as Babbitt unleashed there are being felt from Washington, D.C., to Washington state. The stress of success is enough to make some enviros pine for the bad old days, before they had to confront the political limits to their agenda and to learn the art of the possible. They really don't know what to make of the Everglades settlement. It doesn't look like a solution, but it sure doesn't look like a crisis anymore, either.

"The bottom line for the environmentalists is how do you induce people to send money to sustain the movement," Babbitt says. He knows the fundraising game well, having mounted more than his share of appeals for LCV. "For years and years, they said, 'James Watt is out to destroy life on Earth as we know it — send money.' 'The Exxon *Valdez* just crashed — send money.' "

"The game has changed," he adds. "It's a lot harder now to begin the sentence that ends with 'Send money.' "

Grazing Hell

BRUCE BABBITT'S IS THE HARDEST SELL IN American politics. In an age of fundamentalism, he's put all his chips on the middle ground. But perhaps negotiating between hopelessly polarized parties is a recipe for stalemate.

Take grazing. Every year at budget time, for more than a decade now, a politician has inserted a grazing-fee hike into a congressional spending bill. Every year, another pol has taken it out. Grazing fees are a key item on the mainstream green agenda; Babbitt is said to be less enthusiastic, because raising fees looks like taking money from cowboys and sending it to Washington. But when the mining and timber lobbies threw in with the cattle ranchers, the battle was joined.

Raising fees, says the cattle lobby, will kill the West; never mind that several states have done so without causing catastrophe. "One group that never seems to want to compromise is livestock," says Jim Baca. "No matter how much you gave them, it would never be enough."

"We can argue about the details," says Brock Evans of the National Audubon Society. "But no one's even put the word 'reform' after 'grazing.'"

No 100% Solution

WHAT'S LACKING IN BABBITT'S GAME SO FAR is a sense of emotional commitment. He could help himself by defining his bottom line a little more clearly. As it is, many achievements — notably the grazing rules, but also the plan for the Northwest forests — could be monkey-wrenched by the next administration.

Perhaps detachment is natural for someone who searches for compromise. But what if there is no common ground? Babbitt has had to be dragged into making hard decisions, and seems to be swayed by the volume of an argument rather than its substance.

"We've noticed that they tend to be more responsive to us when we scream the loudest," says one environmental lobbyist with access to Interior.

The morning after Clinton appointed Stephen Breyer to the Court, Babbitt addressed a department-wide employees' meeting and described the Court's temptations: "Never again giving any political speeches; constituent mail you can throw in the wastebasket; life tenure." Pause. "But I'm too young to take a vow of political celibacy."

The employees cheered and Babbitt blushed. Then he launched into his latest version of the stump speech. "The 100% solution does not exist," he declared. "You are no longer dealing with pieces of land on a map, where you can say preserve it all, or cut it all down."

Babbitt's most urgent task is to save the Endangered Species Act, due for reauthorization by a bloodthirsty Congress in 1995. The troubled Act's fate could determine history's verdict on Babbitt.

In the meantime, his goal is to hollow out enough room in that otherwise rigid law to allow some development to continue while protecting at-risk species — to avoid framing a contest between human jobs and mouse-munchers. He calls it "ecosystem management."

"Once you define your task as ecosystem management, you are doomed to upset about 80% of the interested people," he says. The stakes are higher than any one species or ecosystem. A success story, a win-win situation, would pull the rug out from under the opposition without taking them head-on.

"It's not a matter of notching your gun, victories vs. losses," Babbitt says. "We're in a brand new era." He sees his mission as "imparting a new way of dealing with environmental problems," promoting sustainable resource use while protecting major ecosystems.

This expansive vision may shatter on the rocky politics of 1995, when every interest group under the sun, pro-environment and anti-, is hoping not for victory, but for *defeat* — that one, transcendent defeat that'll make the "send money" sentence practically write itself.

Who is Bruce Babbitt?

Bruce Babbitt doesn't easily fit into a pigeonhole. The environmentalists who pronounce him a disappointment are guilty, perhaps, of a too-short memory. They recall only the stump speeches he made for two years as president of the League of Conservation Voters. They forget his long, complex, and idiosyncratic prologue.

His biography, told and re-told so often that it has acquired the patina of legend, is a braid of conflict. One strand is rooted in the traditional exploitation of Western lands, the other in the earthy stirrings of the modern conservation movement. He resonates to Aldo Leopold and John Wesley Powell, but also to the steam whistles of sawmills in his native Flagstaff.

The Babbitts arrived from Ohio in the 1880s, when Arizona was raw frontier, and remain one of the state's leading families. Led by Bruce's grandfather and his five sons, the Babbitts became Indian traders and, ahem, cattle ranchers. Eventually, Flagstaff had Babbitt car dealers and morticians and ultimately lawyers and public officials. Their CO Bar ranch near Grand Canyon endures as one of the largest in the state. Young Bruce went East to college, then to England on a Marshall scholarship. After graduating from Harvard Law School, Babbitt went South to fight Johnson's War on Poverty, then came back home to satisfy his cowboy *noblesse oblige*.

"Folks like that are sort of the Medici of places like Arizona," says Jim Webb, an Arizona native and political acquaintance of Babbitt who now represents the Wilderness Society in Miami. "There's sort of a mission to civilize."

Babbitt was all but destined for high office: elected state attorney general in 1974, he inherited the governorship in 1978 when the sitting governor resigned and his successor died. As the Democratic governor of a rabidly conservative state, he learned to make the most of whatever hand he was dealt. He could play hardball, too. In the early 1980s, when his uncle was complaining about "extremists," Governor Bruce was blasting cattle ranchers as "greedy." It helped that he had the veto then, and he wasn't afraid to use it.

Babbitt's passion for the outdoors became an inseparable part of his political persona. Brock Evans of the National Audubon Society recalls how, in 1988, the League of Conservation Voters board asked the Democratic candidates where they stood on the protection of Northwest forests. "Bruce Babbitt, in addition to giving the right answer, described what a ponderosa pine forest smells like after a rain," Evans recalls.

Babbitt also knows the smell of sawdust. He remains connected to the land in ways that most environmentalists are not. So the problems of running a cattle ranch are not trivial to him. Unlike the fire-and-brimstone ranchers who dominate the grazing debate, the Babbitts rarely tangled with the federal range managers. "My grandparents were basically peacemakers," says Bruce. "They were Catholics with a lot of Quaker in them."

once and future farming

BY RONALD BAILEY

environmentalists who want to preserve wildlands from the farmer's plow as we feed a burgeoning human population should reconsider an old enemy: chemical-based agriculture.

ILLUSTRATIONS BY BRIAN CRONIN

FOR THOSE OF US WHO WISH TO PRESERVE THE PLANET'S DIVERSITY OF SPECIES, HIGH-TECH, CHEMICALLY-ASSISTED agriculture is an environmentalist's best friend. • That's right. Soaring growth in human population threatens to destroy most of the world's remaining rainforests, wetlands, and montane ecosystems, drastically reducing species diversity. Despite advances in organic farming techniques, such as integrated pest management and fertilizing with "green" manures, overly relying on these practices will result in the plow down of forests to feed a population that is estimated to nearly double by 2050. • Environmentalists must face up to the fact that unless high-yield crop varieties, pesticides, and fertilizer are widely adopted in developing nations, the world's food supply will be outstripped by spiraling demand. Inadequate crop yields translate directly into more forests falling under the plow. • Many in the environmental community resist this conclusion. They tend to be very skeptical of high-tech, chemically-assisted farming.[1] Some pine for a smaller scale, more

communitarian type of agricultural system. They dismiss modern agriculture as a form of "industrialization," or demonize it for its "chemicalization." Some activists baldly assert that the "drive to industrialize agriculture and increase output has also led to major ecological disasters because of the artificial nature of all agricultural systems."[2]

Much of the environmental community's disenchantment with modern, high-intensity agriculture can be traced to Rachel Carson's 1962 book, *Silent Spring*. She was certainly right to warn of the dangers of excessive pesticide use. But ironically, the real threat to birds, mammals, and even insects comes not from modern farming methods and agricultural chemicals, but from what would happen if they were eliminated.

As Death Rate Slows, Population Soars

THE CENTRAL ECOLOGICAL FACT OF OUR time is that the world's human population is going to increase substantially for at least another generation. No matter what urgent steps we take now, another 2 billion people — at minimum — will join us during the first part of the next century. The more likely scenario, according to United Nations' projections, is that the world's population will probably double in the next 50 years.

It is a popular misconception that skyrocketing birth rates are causing the increase in human population. That is simply not true. Such rapid growth is a result of a dramatic reduction in the death rate during the 20th century. Human life spans have increased dramatically, from a global average of 30 years in 1900 to more than 65 years by 1990.[3]

"Rapid population growth commenced not because human beings suddenly started breeding like rabbits, but rather because they finally stopped dying like flies," says Nick Eberstadt, a demographer at Harvard University.[4]

Despite all the hype that you heard from September's United Nations' Population Conference in Cairo about reducing population growth, the plain fact is that billions more people need to be fed. "Just to keep pace with population growth and rising incomes, the world will need to produce an extra 32 million tons of grain (principally rice, wheat, and corn) every year," predicts agronomist and Nobel Peace Laureate Norman Borlaug.[5]

The methods we employ for feeding such a vast population will make all the difference to the kind of world we will live in. Will humanity inhabit a planet still rich with millions of wild species, or will we need to farm countless acres of wildlife habitat to feed our vast numbers?

Boosting Crop Yields Preserves Land

BIOLOGISTS SUCH AS HARVARD UNIVERSITY'S E.O. Wilson fear that thousands of irreplaceable plant and animal species may soon go extinct, as farmers redouble their efforts to sustain the world's expanding population. In his book *The Third Revolution: Environment, Population and a Sustainable World* (Penguin, 1992), Paul Harrison estimates that "loss of habitat to humans menaces two-thirds of threatened vertebrate species." But modern, high-yield farming, if not derailed by bad environmental and economic policies, will guarantee that this won't happen, say a growing number of agricultural researchers.[6]

By dramatically increasing the amount of food grown on land already under cultivation, humankind has already managed to save millions of square miles of natural landscapes from being plowed under. Higher yields were achieved by substituting more productive crop varieties, pesticides, and fertilizers for extra acreage.

Before the 20th century, the world increased its food supply chiefly by expanding the amount of land cleared and planted in crops. Yields of wheat, rice, and other staples were not much higher than in the Middle Ages. Only with the advent of science-based agriculture did crop productivity take off.[7] While world population has doubled over the past 40 years, agricultural productivity has tripled.[8] Much of that increased productivity resulted from the "Green Revolution" of the late 1960s and early 1970s. International teams of agricultural scientists led by Norman Borlaug developed highly productive dwarf varieties of staple grains such as wheat and rice. These fertilizer-responsive hybrids were adopted throughout the world, dramatically boosting crop yields and forestalling the massive famines forecast by famous population doomsters like Paul Ehrlich, who in 1968 predicted that during the 1970s, "due to famines — hundreds of millions of people are going to starve."

In fact, food is cheaper and more abundant than at any other time in modern history. Since 1980, according to the World Resources Institute, the global average price of food has plummeted by an astonishing 57%. And yet, worldwide, crops are grown on just slightly more land than in the 1960s — nearly 6 million square miles — an area equal to that of South America.[9]

Norman Borlaug recently told Congress that "by sustaining adequate levels of output on land already being farmed in environments suitable for agriculture, we restrain and even reverse the drive to open more fragile lands to cultivation."

U.S. Department of the Interior analyst Indur Goklany calculates that without the dramatic productivity increases that high-tech farming achieved

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[1] See Carson, Rachel, *Silent Spring*, (Houghton Mifflin, 1962); Goering, Peter et al., *From the Ground Up: Rethinking Industrial Agriculture*, (Zed Books, 1993); Bender, Jim, *Future Harvest: Pesticide Free Farming*, (University of Nebraska Press, 1994); and Conford, Philip, ed., *A Future for the Land: Organic Practice From a Global Perspective*, (Green Books, 1992).

[2] Conford, 1992, p. x.

[3] Eberstadt, Nicholas, "Population, Food and Income: Global Trends in the Twentieth Century," July, 1994, manuscript, p. 25.

[4] Eberstadt, p. 26.

[5] Borlaug, Norman. Testimony of the Former General Director of the International Maize and Wheat Improvement Center before the House Agriculture Committee. Subcommittee on Foreign Agriculture and Hunger. March 1, 1994. Federal Document Clearinghouse, Inc.

[6] See Waggoner, Paul, "How Much Land Can Ten Billion People Spare for Nature?", Task Force Report No. 121, Council for Agricultural Science and Technology & The Rockefeller University (February, 1994); Plucknett, Donald, Senior Scientific Advisor, Consultative Group on International Agricultural Research, Paper: "Prospects of Meeting Future Food Needs Through New Technology," prepared for the Roundtable on Population and Food in the Early 21st Century (February 14-16, 1994, Washington, D.C.); Oram, Peter & Behjat Hojjati, Paper: "The Growth Potential of Existing Agricultural Technology," prepared for the Roundtable on Population and Food in the Early 21st Century (February 14-16, 1994, Washington, D.C.); Goklany, Indur & Merritt Sprague, "An Alternative Approach to Sustainable Development: Conserving Forests, Habitat, and Biological Diversity by Increasing the Efficiency and Productivity of Land Utilization," Office of Program Analysis, U.S. Department of the Interior (Washington, D.C., April 4, 1994); Avery, Dennis, Director of the Center for Global Food Issues at the Hudson Institute, *Biodiversity: Saving Species with Biotechnology* (Hudson Institute, 1993); Avery, Dennis, "Saving the Planet with Pesticides and Plastics," unpublished manuscript, 1994.

since 1950, globally "an additional [910 million] hectares would have been converted from forest, wood, pasture, and grasslands — an amount equivalent to the net global loss of forest and wood lands between 1850 and 1980."[10] In other words, adopting chemical-based agriculture saved more than 3.5 million square miles of rainforests, wetlands, and mountain terrain from the farmer's plow.

Dennis Avery, who worked for many years on international food issues at the U.S. Department of Agriculture and who now heads the Hudson Institute's Center for Global Food Issues, thinks that Mr. Goklany's numbers for the amount of land spared through modern farming are too low. He figures roughly that tripling yields translates directly into preserving as much as 10 million square miles of wilderness from the plow — more than the total area of North America.

High-yield farming has already enjoyed marked success in India, reports agricultural researcher Paul Waggoner of the Connecticut Agriculture Experiment Station. In a paper titled "How Much Land Can 10 Billion People Spare for Nature?", Dr. Waggoner calculates that if India's wheat yields had remained at 1960s levels, local farmers would have been forced to clear an additional 42 million hectares (162,000 square miles) to grow the food they supply today.

"Environmentalists are guilty of bad ecological accounting," says Mr. Avery. "Today's typical environmentalist worries about how many spiders and pigweeds survive in an acre of monoculture corn without giving credit [to] the millions of organisms thriving on the two acres that didn't have to be plowed because we tripled crop yields."

Pesticides Key to High-Yield Farming

EVEN IF MODERN AGRICULTURE IS RESPONSIBLE for saving millions of square miles of natural ecosystems, can yields increase enough to prevent future losses?

Lester Brown, head of the Worldwatch Institute, doesn't think so. Earlier this year, he declared in a Worldwatch press release that there is a "diminishing backlog of agricultural technology"; he further warned, in *State of the World 1994* (Norton), that there are "no new technologies that could lead to quantum leaps in world food output."

Dr. Brown's views are increasingly in the minority. The growing consensus among researchers is that scientific agriculture is nowhere near the limits for improving crop yields. And the biggest gains in yields will continue to come from breeding more productive, pest- and drought-resistant crop varieties.

Donald Plucknett, the recently retired senior scientific advisor of the Consultative Group on International Agricultural Research (CGIAR is the international network of agricultural research institutes which nurtured the Green Revolution), attributes 50% of the increase in today's yields to genetic improvements in modern cultivars.[11] For example, hybridization has already boosted top yields in corn by more than six-fold. The growing season for rice has been shortened from 180 to 110 days, allowing for double and even triple cropping. And Dr. Plucknett believes farmers can increase rice productivity by 60% in the early 21st century.

High-yield agriculture, now and for the foreseeable future, will be impossible to sustain without herbicides, insecticides, and fungicides.

Some of the credit for boosting yields must also go to pesticides and fertilizers. In 1962, Rachel Carson wrote in her classic *Silent Spring* that using pesticides was a "smooth superhighway" to disaster. She urged farmers to take "another road," free of "poisonous chemicals." In apocalyptic tones, she warned that turning away from pesticides was "our only chance to reach a destination that assures the preservation of the Earth."[12]

Ms. Carson argued that instead of relying on synthetic pesticides to control pests, we should develop and employ "biological solutions" (e.g., using pest predators and sterile males of insect pests, and applying organic pesticides). More than 30 years later, we now know that her hopes for biological pest controls were too optimistic. Many of the "solutions" she recommended are still little more than glimmers in the eyes of laboratory scientists. Those that are available for field application are relevant just for a few niche crops. In a very real sense, survival of the world's wildlands is due directly to continued use of the "poisonous chemicals" that Ms. Carson opposed.

High-yield agriculture, now and for the foreseeable future, will be impossible to sustain without herbicides, insecticides, and fungicides. Of course, we should reduce chemical residue and their adverse health effects on consumers and workers where practicable. But if pesticide use were significantly curtailed, crop yields here and abroad would fall dramatically. Which is worse for wildlife and biodiversity — millions of square miles of habitat cleared and planted in low-yield corn and wheat, or the relatively transient harm caused by pesticide residues?

Consider what's really at stake. A 1992 task force on pesticides for the Council for Agricultural Science and Technology estimated that "all crop production in the would decline 30% and food costs would increase by 50% or more without the use of agricultural pesticides." Millions of acres of wildlife

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[7] Waggoner, Paul, 1994, pp. 24-30; Plucknett, Donald, 1994, pp. 7-18. [8] U.N. Long-Range World Population Projections, p. 14; *World Resources 1994-1995*, (Oxford Univeristy Press, 1994), pp. 27-42, 107-28, 262. Lester Brown et al. *State of the World 1994*, (Norton, 1994) p. 182; Avery, Dennis, *Biodiversity: Saving Species with Biotechnology*, p. 36. [9] Goklany, Indur. Paper "Is It Premature to Take Measures to Adapt to the Impacts of Climate Change on Natural Resources?" Office of Policy Analysis, U.S. Department of the Interior, 1994, Table 1, p. 3.; Avery, interview, October 1993. [10] Goklany, 1994, p. 2. [11] Plucknett, Donald. "Science and Agricultural Transformation," International Food Policy Research Institute Lecture No. 1, September, 1993. [12] Carson, 1962, p. 244.

Kinder, Gentler Farming

Boosting crop yields is not entirely dependent on chemical pesticides and fertilizers. By drastically reducing soil erosion, modern tillage methods ensure that croplands remain productive.

For thousands of years, farmers had to plow deeply in order to bury weed seeds that germinate and choke crops. Plowing has a downside. It loosens the soil and leaves it bare, making it highly vulnerable to wind and water erosion.

Now, two new, land-saving tillage techniques are being widely adopted by farmers. The first is called "conservation tillage," where farmers simply disc plow the top three or four inches of soil, mixing the "residue" (stems, leaves, roots) from the previous crop in the upper soil layer. These crop wastes add organic matter and retard erosion. Researchers found that if 30% of the soil surface were left covered with crop residue, farmers could cut erosion by 50%, according to the Hudson Institute.

The second land-saving technique is "no-till" farming, in which crops are planted through a covering of sod which is killed back with an herbicide. The growing crop is later overseeded with grass to protect the soil surface after harvest. No-till, which ensures that the soil is never left bare, cuts soil erosion by 95%.[1]

Both forms of tillage are expanding rapidly in temperate and tropical countries.[2] Already, more than 100 million acres in the U.S. are farmed using either no-till or conservation tillage. The Department of Agriculture estimates that by the year 2000, nearly 70% of all U.S. cropland will use these types of tillage.[3]

Another advance is improved irrigation techniques. Old-fashioned flood irrigation, which has been in use since ancient Mesopotamia, provides just 30% efficiency in water use. Today, center-pivot sprinkler systems offer 75% to 85% water efficiency. Long, rotating sprinkler arms deliver water directly to crops when they need it, avoiding evaporative losses from canals and holding ponds. With "trailing-tube" irrigation, a variation of center pivot, plastic tubes hang down to the ground and drip water directly to the crops' roots as the pivot circulates. Trailing-tube irrigation can boost water efficiency to 95%, eliminating the evaporation that occurs in conventional sprinkler systems.[4]

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[1] Avery, interview, October, 1993. [2] Oram, Peter & Behjat Hojjati, Paper "The Growth Potential of Existing Agricultural Technology" presented at the Roundtable Meeting on Population and Food in the 21st Century, February 14-16, 1994, p. 7. [3] Oram et al., 1994, p. 7. [4] Avery, interview, October, 1993.

habitat would be destroyed to make up for the shortfall in crop production that would result from the total elimination of pesticides. This is not only true for farmers in the U.S. In the Philippines, "long-term trials on rice show that without pesticides, losses amount to more than 30% of the crop."[13] If yields were reduced to anywhere near these levels, clearly much more land would be converted to crop production to make up for the losses.[14]

Some environmentalists, hungering for a chemical-free utopia, point to "Integrated Pest Management" or "organic" agricultural techniques. IPM can reduce pesticide use, but it is certainly not the royal road to completely chemical-free farming. IPM is very knowledge intensive, relying on a suite of non-chemical techniques to control pests. Such methods include, according to the World Resources Institute, "crop rotation, planting more than one crop, early or delayed planting to protect a crop during the most vulnerable stages of growth, manipulation of water and fertilizer, field sanitation (such as plowing under harvest stubble to remove pest hideaways), and the use of 'trap crops' to lure pests away from the main crop." IPM seeks to establish a threshold of "acceptable damage" to a crop, after which farmers will often need to resort to pesticides to protect their crops. "[IPM] is not a panacea, it is unlikely to eliminate the need for chemical pesticide use entirely," conclude International Food Policy Research Institute analysts Peter Oram and Behjat Hojjati.

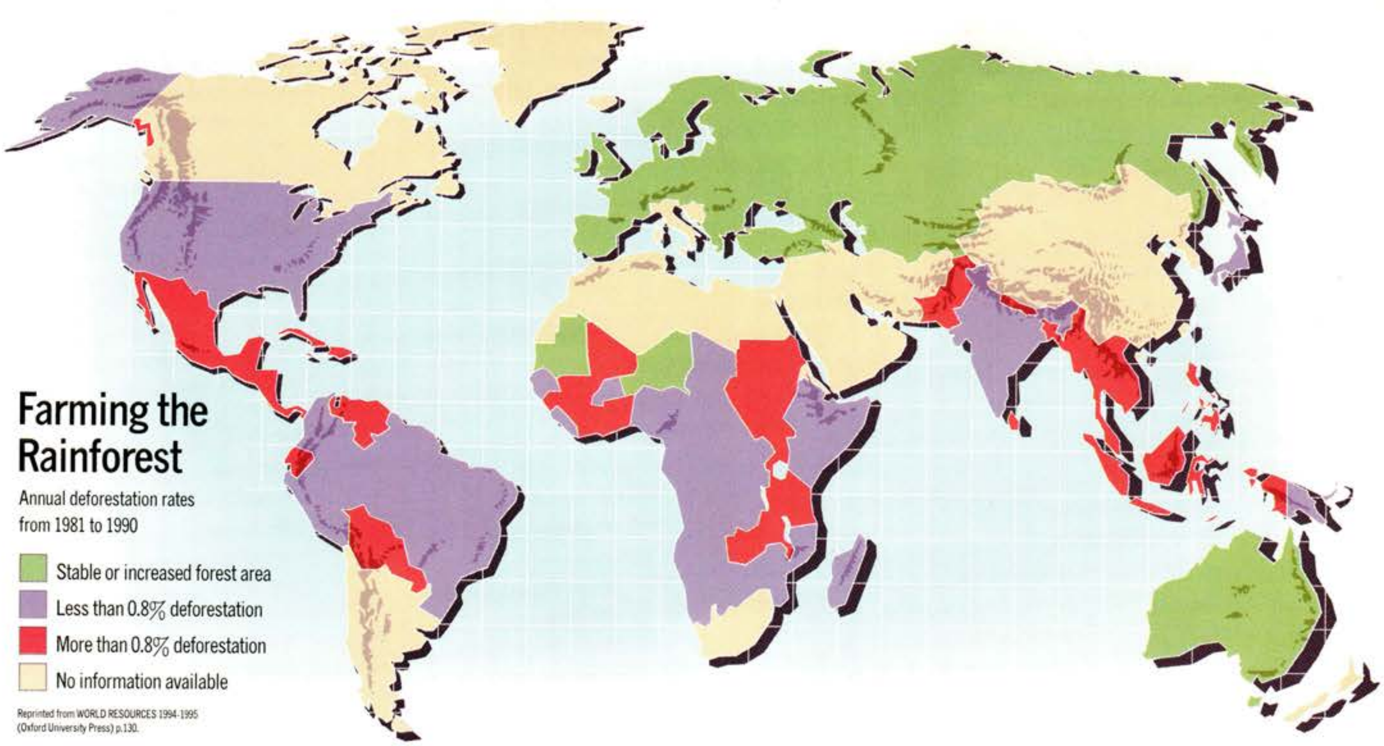
Researchers have made advances in developing more environmentally benign pesticides such as glyphosate and the sulfanylureas, which are replacing longlasting organochlorides. Leonard Gianessi, a senior research associate at the National Center for Food and Agricultural Policy, points out that "many new herbicides are used at rates as low as 0.02 pounds per acre in comparison to 2 pounds per acre for older herbicides."[15] He adds that for many modern pesticides, the "active ingredients are present in amounts so small that their presence in the environment cannot be measured."

Some environmentalists herald new biological pesticides as a way to avoid synthetics. The problem is that many are very specifically targeted. This sounds good, but farmers often need wide-spectrum herbicides to control the huge variety of weeds they find in their fields at any one time. Dr. Gianessi predicts that for the foreseeable future, wide-spectrum pesticides of all types will be necessary to keep crop yields high.

The choice that environmentalists face is between saving the world's biodiversity by forestalling the plowdown of wildlife habitat through the continued use of farm chemicals, or protecting themselves from the minuscule health risks posed by pesticides. And the health risks *are* minuscule.

University of California at Berkeley biochemist Bruce Ames calculates that "about 99.99% of all pesticides in the human diet are natural pesticides from plants. All plants produce toxins to protect themselves against fungi, insects, and animal predators such as humans."[16] Plants are packed with potent natural rodent carcinogens such as caffeic acid in lettuce and hydrazines in mushrooms. Dr. Ames estimates the average person ingests daily about 1,500 milligrams of natural pesticides and just 0.09 milligrams of synthetic pesticide residues. Of the pesticides we consume, just one-ten thousandth are synthetic.

Dr. Ames, who developed the chief method used by laboratories worldwide for detecting carcinogens, estimates that far less than 1% of all human cancers are due to exposure to synthetic chemicals (including pesticides) or pollution. Toxicologist Robert Scheuplein of the Food and Drug Administration's Center for Food Safety agrees. "Ordinary food contains an abundance of cancer initiators which in total dwarf all of the synthetic sources," writes Dr. Scheuplein in an essay for *Global Food Progress* 1991 (Hudson Institute). "The total risk from all pesticides and contaminants is a thousand times less than the estimates



Farming the Rainforest

Annual deforestation rates from 1981 to 1990

🟩 Stable or increased forest area
🟪 Less than 0.8% deforestation
🟥 More than 0.8% deforestation
⬜ No information available

Reprinted from WORLD RESOURCES 1994-1995 (Oxford University Press) p.130.

of cancer risk due to naturally occurring carcinogens."

The Ecological Tradeoff For Cutting Fertilizer

IN THE EARLY 19TH CENTURY, GERMAN researcher J. von Liebig launched modern scientific agriculture when he discovered that by supplying higher levels of certain minerals and organic chemicals, he could substantially boost plant productivity.[17] In particular, farmers have found that they can enhance growth if they supply their crops with nitrogen, phosphate, and potash, also known as fertilizer. A natural fertilizer source long exploited by farmers is manure from farm animals. Leguminous plants, such as soybeans, harbor bacteria in their roots which synthesize nitrogen into a usable form for other plants. But today, the main source for nitrogen fertilizer is ammonia, which is made by combining nitrogen from the atmosphere with a feedstock of hydrogen (usually from natural gas). The price for mined phosphate and potash has been falling steeply, making them more affordable for farmers worldwide.[18]

Environmentalists oppose the use of fertilizer because, like pesticides, it has sometimes been overused and the excess has contaminated wells, streams, lakes, and caused choking algae blooms. But again, the trade-off is much the same as with pesticides.

Fertilizer is essential to increasing crop yields. "The soil in its natural condition can supply only about 30 to 40 kilograms per hectare of plant nutrients, enough for a yield of 1,000 kilograms per hectare," Dr. Plucknett writes in a paper titled "Science and Agricultural Transformation." With fertilizer, typical yields today are three to four times higher. We certainly should discourage overuse of fertilizer, but we should remember that underuse leads to farming more wildlife habitat to make up for the shortfall in crop production.

Characteristically, Lester Brown of the Worldwatch Institute points to the recent global decline in the use of fertilizer as an indication that the era of rising crop productivity is at an end. Despite Dr. Brown's gloomy views, there is plenty of opportunity for increased fertilizer use to boost yields in the developing world, especially in Africa and South America. In an interview with the *Financial Times*, Norman Borlaug observed: "Some people say that Africa's food problems can be solved without the application of chemical fertilizers. They're dreaming. It's not possible."

Crop yields in Africa tend to be extremely low because farmers there have not had access to fertilizer, pesticides, and hybrid seeds. Farmers can't substitute animal manure for chemical fertilizers. In a paper titled "The Growth Potential of Existing Agricultural Technology," analysts Peter Oram and Behjat Hojjati assert: "While more efficient use of farmyard manure might be possible, it . . . could never be the key to adequate sustainable production." That's because the world's farm animals, according to Dennis Avery, produce just 10 to 20% of the manure needed to enrich soils in the absence of chemical fertilizers.

"International agencies and bilateral donors should not allow their support for efficient fertilizer use in developing countries to be undercut by ill-informed public criticism in affluent coun-

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[13] Oram et al., 1994, p. 34.
[14] Pickett, John. Chemistry and Industry, "Safer Insecticides: Development and Use." January 6, 1992, p. 25.
[15] Gianessi, Leonard. "The Quixotic Quest for Chemical-Free Farming," *Issues In Science and Technology*, Fall 1993, p. 32.
[16] Ames, Bruce and Lois Gold. "Environmental Pollution and Cancer: Some Misconceptions," In *Phantom Risk: Scientific Inference and the Law*, edited by Foster et al. (MIT Press, 1993), p. 153.; see also Gold, Lois et al., *Science*, "Rodent Carcingens: Setting Priorities," (October 9, 1992), p. 261; see also, Ames, Bruce et al., Proceedings of the National Academy of Science, (Vol. 87, 1990) pp. 7772-7776.
[17] Waggonner, 1994, p. 37.
[18] Waggoner, 1994, p. 22.

tries," warn Oram and Hojjati. "Its potential contribution to meeting food needs by 2020 is too important for that."

Can Farming with Chemicals Save Wildlife?

THE GREATEST THREAT TO BIODIVERSITY remains the burgeoning populations in developing nations, particularly in the tropics, where many farmers continue to practice low input, low-yield agriculture. Dr. Borlaug noted the unsustainability of "low-input" farming in recent testimony before the Agriculture Committee of the House of Representatives. He told Congress that "slash and burn agriculture [is] a practice that presently causes the annual loss of more than 25 million acres of tropical rainforest. As an aside, it is worth mentioning that slash and burn techniques supported agriculture in traditional societies for millennia. It was not until population pressures accelerated the demands on this system that it became unsustainable."

Interior Department analyst Indur Goklany also criticizes low-input farming: "One consequence of low-input sustainable agriculture (LISA) is that more land would be devoted to crops than would be otherwise. This extra land used for agriculture will mean that much less is available to other species. What we need is not LISA, but HOSA — high-output sustainable agriculture."

Slash and burn agriculture is a practice that presently causes the annual loss of more than 25 million acres of tropical rainforest.

Can the agricultural productivity of developing nations be raised in time to save the world's biodiversity? Yes, according to a recent report by Donald Plucknett, the former chief scientist of the authoritative Consultative Group on International Agricultural Research. He concludes that worldwide harvests could be boosted by 50%, just by making existing improved crop varieties and agricultural knowhow more widely available. For instance, corn yields in West Africa currently are a meager eight-tenths of a ton per hectare. By switching to hybrid seeds and using fertilizer, African farmers could boost production nine-fold, to seven tons per hectare. The Hudson Institute's Dennis Avery estimates that for every hectare converted to high-yield farming, as many as eight hectares could be allowed to return to their natural state.

Dr. Plucknett argues that until farmers in developing countries adopt high-yield techniques, they "tend to move more and more onto marginal lands to meet food and production needs, destroying natural ecosystems in the process." Once yields per hectare begin to increase, expansion of the agricultural frontier onto marginal lands slows dramatically. Thus, high-yield farming is "land-saving agriculture" and is very "environmentally friendly," says Dr. Plucknett.

Ironically, many environmentalists refuse to believe the good news. In *State of the World* 1994, Lester Brown warns that world grain production per capita peaked in the 1980s, and that the "bottom line is the world's farmers can no longer be counted on to feed the projected additions to our numbers."

It is true that world grain production has slowed, but that's because the U.S. and Europe, which are drowning in surpluses, are paying their farmers to cut production. "More is not produced because it is not needed," writes Nikos Alexandratos of the Food and Agriculture Organization of the United Nations, in a paper titled "The Outlook for World Food and Agriculture to the Year 2010."

Throughout the 1980s, grain production in developing nations rose at the spectacular rate of 5% per year, easily outpacing the Third World's population growth of 1.9% annually, according to the Hudson Institute. In the 1980s, China's agricultural output soared by an unprecedented 50%, while Indonesia increased its rice productivity by more than one-third. Looking to the future, Dr. Alexandratos predicts that once "satisfactory" levels of per capita food consumption have been achieved, extraordinary gains in productivity will no longer be necessary. More cautious than many analysts, Dr. Alexandratos expects that world food production could slow to a 1.8% increase per year — but adds that "it will continue to outpace a 1.5% growth rate in world population."

To show clearly how chemical-based agriculture slows land clearing, Douglas Southgate, an associate professor of agricultural economics at Ohio State University, contrasts the experiences of Chile and Ecuador. Ecuadorian farmers have not increased their yields and are clearing land at a blindingly fast pace — crop and pasture land is increasing 2% annually, the second highest rate in Latin America. Meanwhile, Chile has invested in high-tech agriculture, including higher applications of pesticides and fertilizers and increased irrigation. Consequently, Chile's agricultural frontier has hardly expanded at all — land cleared for crops has increased by just 0.1% annually.

"My statistical analysis pretty clearly shows that countries that boosted their agricultural yields are the same countries where land clearing is very, very slow," says Dr. Southgate. "By contrast, countries where yields are flat are the same countries that are losing tropical forests and other natural ecosystems at a rapid rate."

Abundant evidence suggests that environmentalists who want to preserve the world's diminishing biodiversity must become advocates of modern, high-yield agriculture. Those who refuse should attempt to honestly answer Dennis Avery's pointed question: "How many millions of square miles of wildlife habitat are [you] willing to give up in order to have chemical-free farming?" He adds, "This is a strange way to save wildlife." Indeed it is.

COUNTERPOINT

We've Been Down that Road Before

BY PAUL FAETH, SENIOR ASSOC. IN THE ECONOMICS & POPULATION PROGRAM AT WORLD RESOURCES INSTITUTE

It's time to hop off the pesticide treadmill and employ agricultural techniques that account for the long-term health of the soil and its stewards.

IN QUOTING DENNIS AVERY'S LINE THAT environmentalists worry more about the fate of spiders and pigweed in monoculture cornfields than they do about getting higher crop yields, Ronald Bailey sets up a straw man — which he then easily demolishes. But his straw man is more akin to the "back to the Neolithic" fringe than to anyone in the environmental mainstream.

I couldn't agree more with Mr. Bailey's assertion that it's crucial to step up agricultural productivity to feed a global population projected to double by mid-century. My only quarrel with him on this score is over *how* to intensify agriculture, not whether it should be intensified. The paramount concern must be to increase crop yields in environmentally sensitive ways that protect human health and the soil and water that are agriculture's very foundation. Heavy use of agrochemicals can bring high yields in the short run, but the cumulative damages can be considerable. Those of us whose research demonstrates that resource-conserving farming practices can be just as productive as the chemical-intensive kind contend that the goal should be efficient use of chemicals, not wide use.

Compelling physical evidence from around the world suggests that current farming practices in many areas cannot be sustained much longer. Soil degradation from erosion, salinization, compaction, and depletion of organic matter have made an estimated 2 billion hectares of once-arable land irreversibly unproductive.[1] Without conservation measures, more than 500 million hectares of rain-fed cropland may become unproductive over the long term in Asia, Africa, and Latin America.[2]

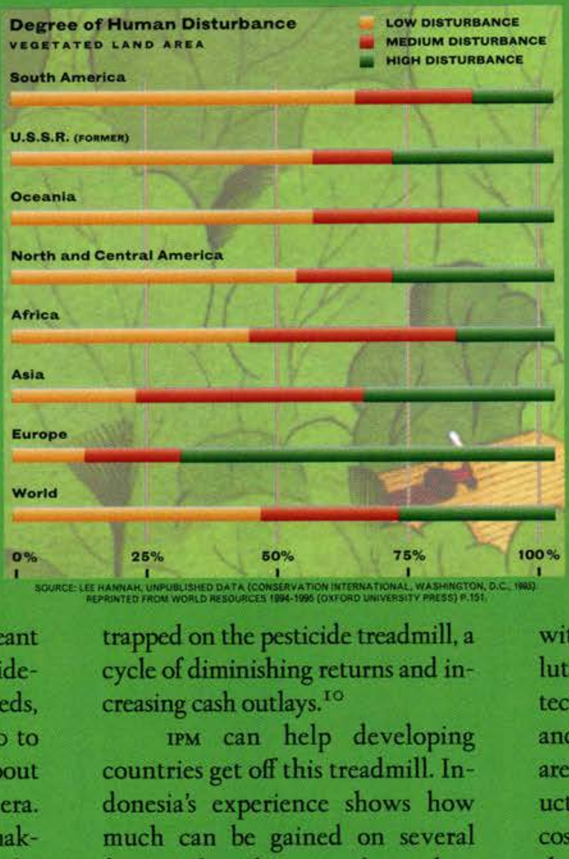
Fortunately, readily available practices can improve crop yields while reducing environmental damage. Water harvesting techniques developed in Africa can reduce soil erosion and improve infiltration to make more water available to plants. Irrigation management practices can reduce soil salinization, keeping valuable land in production. Soil tests can reduce the amount of fertilizer applied, avoiding unnecessary damage to ground and surface water, while maintaining yields and saving farmers' money. Judicious use of insecticides and pest scouting in rice fields can help to maintain populations of natural predators, avoiding outbreaks of pests and unnecessary expenses. Crop rotation can help farmers to avoid chemical dependencies that occur when pest populations build up under monocultural cropping practices.

Where agrochemicals are heavily used, the off-farm environmental costs of farming may be even greater than the soil-productivity losses. A tiny percentage of the pesticides applied to a given field — less than 0.1% for many insecticides — actually reaches the target pest; the rest, by definition, becomes an environmental contaminant.[3] The farm workers who apply these chemicals and the ecosystems downstream suffer by far the worst impacts. Fertilizers don't stay put, either. Crops take up only about half the nitrogen fertilizers applied to them, and much of the rest — about 4.7 million tons a year in the U.S. — seeps into groundwater or drains into rivers, lakes, and estuaries. In rural Nebraska, for instance, the water supplies of nearly one in five communities contain nitrate levels near or above the Environmental Protection Agency's limit for drinking water.[4] What's more, farm run-off has become the single largest source of surface-water pollution in the U.S.[5]

How can developing countries — with little or no capacity to regulate or monitor these problems — avoid replicating this pattern and still increase production? Pouring vast amounts of high-priced agrochemicals on every field cannot be the answer. The supply is not unlimited, after all, since these countries are hard-pressed for the hard currency needed to buy agrochemicals. Farmers who use integrated pest management (IPM) need much smaller amounts of pesticides; the more efficient a country's farmers are in using these chemicals, the greater the economic gain.

Mr. Bailey considers IPM too knowledge-intensive for developing-nation farmers, but he ignores the fact that pesticides are even more so — and that dire consequences result when illiterate farmers apply powerful chemicals (some of them banned in the U.S., but still exported) that they aren't trained to use. In one region of the Philippines, for instance, 4,031 cases of acute pesticide poisoning were reported in just seven years, 603 of them fatal. In the group of farmers studied, nearly one-third had four different pesticide-related impairments. When the health costs for pesticide-related illnesses are factored in, farmers' income rises as their pesticide use declines.[6] The problem is not unique to the Philippines. Occupational pesticide poisoning may affect as many as 25 million farm workers a year — or 3% of the developing world's agricultural workforce.[7]

Mr. Bailey also ignores the inconvenient fact that pesticides have by no means ended the problems they were meant to solve. After 50 years of widespread pesticide use, insects, weeds, and plant diseases still claim 30 to 35% of total crop production, about the same as in the prechemical era. Some pests develop resistance, making efforts to control them with the same chemicals increasingly futile, a process that has accelerated since it was first seen in the 1940s with DDT. Today, some 500 insect and mite species — as well as 113 weed species and 150 plant pathogens — are immune to one or more pesticides. Compounding this problem is that insecticides are often more deadly to insect predators than to the pests themselves. Once these natural predators are wiped out, pests multiply, and farmers often respond by increasing dosages or spraying more often — which may bring temporary relief but only hastens the trend toward resistance. Farmers become trapped on the pesticide treadmill, a cycle of diminishing returns and increasing cash outlays.[10]



SOURCE: LEE HANNAH, UNPUBLISHED DATA (CONSERVATION INTERNATIONAL, WASHINGTON, D.C., 1993)
REPRINTED FROM WORLD RESOURCES 1994-1995 (OXFORD UNIVERSITY PRESS) P.151.

IPM can help developing countries get off this treadmill. Indonesia's experience shows how much can be gained on several fronts: when the nation banned 57 of 66 pesticides and adopted an IPM program, pesticide use declined by 60%, the rice harvest increased by 15%, and the government saved $120 million a year in pesticide subsidies. The UN Food and Agriculture Organization is sponsoring IPM programs in eight Asian countries besides Indonesia, which together have trained hundreds of thousands of farmers and saved millions of dollars in pesticides, not to mention the associated health and environmental benefits.[11]

One reason that resource conserving farm practices haven't made more headway is that conventional farm accounting systems measure agricultural productivity, meaning crop yields, but they ignore agriculture's impacts on the productivity of the natural resource base — the maintenance of which is the *sine qua non* of sustainability. Mr. Bailey was very selective in quoting the congressional testimony Norman Borlaug gave earlier this year, for Dr. Borlaug clearly embraced the need for natural-resource accounting in the same testimony:

"At the very least, research must make explicit some of the costs associated with resource degradation and pollution when comparing alternative technologies and options for farmers and for society. When offsite effects are included, when inputs and products are properly valued, and when costs associated with degradation of the natural resource base are included, regenerative technologies may be more profitable than conventional technologies."[12]

Mr. Bailey's simplistic picture of farmers swarming onto fragile lands and "plowing down" forests completely ignores inequitable land tenure patterns. In Chile, for instance, the 4% of all farms that are bigger than 40 hectares make up 44% of all the land in production, and peasant farmers have been pushed

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[1] Lal, R. and F.J. Pierce, "Soil Management for Sustainability" (Ankeny, IA: Soil and Water Conservation Society, 1991). [2] World Commission on Environment and Development, *Our Common Future* (New York: Oxford University Press, 1989). [3] *World Resources, 1994-95.* (Washington, D.C.: World Resources Institute, 1994), p. 114. [4] Faeth, Paul, "Paying the Farm Bill: U.S. Agricultural Policy and the Transition to Sustainable Agriculture" (Washington, D.C.: World Resources Institute, 1991). [5] Faeth, Paul, "Agricultural Policy and Sustainability: Case Studies from India, Chile, the Philippines, and the United States" (Washington, D.C.: World Resources Institute, 1993). [6] Faeth, 1993, p.8. [7] *World Resources, 1994-95*, p. 114. [8] *World Resources, 1994-95*, p. 115. [9] *World Resources, 1994-95*, p. 115. [10] *World Resources, 1994-95*, p. 113. [11] *World Resources, 1994-95*, p. 116. [12] Bourlag, Norman. Testimony of the former General Director of the International Maize and Wheat Improvement Center before the House Agriculture Committee, Subcommittee on Foreign Agriculture and Hunger. March 1, 1994. Federal Document Clearinghouse, Inc. [13] Faeth, 1993, p.44. [14] Faeth, 1993, p. 6-7. [15] Faeth, 1991, p. 39. [16] Faeth, 1991, p. 24.

onto steep slopes where the soils are most apt to erode. Nonetheless, our research demonstrates that peasant farmers who switch from traditional farming practices to organic ones, which entail less soil erosion, can maintain higher crop yields — and thus earn more income.[13]

Mr. Bailey is concerned that chemical-intensive farming might be "derailed by bad environmental and economic policies," but my concern is about the pernicious effects of existing policies on resource-conserving agriculture. Subsidies for such agricultural inputs as fertilizers, pesticides, and irrigation water are the chief culprit. Artificially cheapening these inputs encourages farmers to over-use them — while creating fiscal problems for governments — so it's bad policy on both environmental and economic grounds.

Mr. Bailey ends with a question that I consider specious, since it implies that to be an environmentalist is to oppose any use of agricultural chemicals. I've already made the point that this isn't the case, but I'd like to leave readers with a question of my own. First, a few relevant facts. A recent study by the Rodale Research Institute in Pennsylvania[15] shows that organic systems in many cases yield just as much as chemical-intensive ones — this despite the fact that U.S. policy has favored heavy agrochemical use for the past 50 years. Billions of tax dollars have gone into agrochemical R&D since 1945, but only 2% of government agriculture research funds have been spent on alternative, low-input, or organic farming systems.[16] What yields might these environmentally benign systems be producing today — at how little cost to soil and water — if they had been supported as handsomely as chemical-intensive ones?

Ronald Bailey Responds:

I AM HAPPY THAT PAUL FAETH AGREES THAT AGRICULTURAL INTENSIFICATION IS ESsential to saving wildlife habitat. However, Mr. Faeth doesn't explain how to boost yields without modern high-tech, chemically assisted farming. He misquotes Avery — who said that some environmentalists worry more about the spiders and pigweeds in an acre of corn "without giving environmental credit for the millions of organisms thriving on the two acres that didn't have to be plowed because we tripled crop yields." As for setting up a strawman, does Mr. Faeth think prominent environmentalists like Wendell Berry and Kirkpatrick Sale are part of the "neolithic fringe?" Next he claims that "2 billion hectares of once-arable land [is] irreversibly unproductive." This would mean that 7.7 million square miles — twice the size of the Sahara Desert — are devastated. Not true. Mr. Faeth overlooks the fact that most of the world's degraded cropland was damaged by old-fashioned farming techniques, well before modern farming techniques became widespread, e.g., deep plowing and bad irrigation drainage in the Middle East. In fact, modern scientific agriculture can restore the land's productivity. Soil scientists Pierre Crosson at Resources for the Future dismisses Mr. Faeth's claim as "implausible." To date, the most comprehensive study finds just 9 *million hectares* are irreversibly degraded while 300 million hectares suffer severe degradation.[1] This is bad, but it is far less than Mr. Faeth's alleged 2 billion hectares.

Mr. Faeth also claims that organic yields match modern chemically assisted yields. My article cites much evidence to the contrary, but here's a bit more. A recent survey of seven European countries, where organic farming is widespread, finds that organic yields are typically just two-thirds those achieved using modern agrochemicals, e.g. wheat (65%), potatoes (60%), sunflowers (70%).[2]

Mr. Faeth states that pests still "claim 30 to 35% of total crop production." True, but that's 30% of the much higher agrochemical-induced yields. For example, traditional methods yield 1,000 kilograms of grain per hectare and insects eat 300, leaving 700 kilograms for people. Modern methods yield 3,000 kilograms per hectare, insects destroy 900 kilograms, leaving 2,100 kilograms for human consumption. Yields have tripled through use of agrochemicals and both people and pests eat better.

I agree with Mr. Faeth that all subsidies should be eliminated. In turn, I hope he concedes that knocking down barriers to global free trade in food will help protect wildlife and provide greater food security for people. Also, pesticide use should be curtailed where possible and a major worldwide effort should be made to train farmers how to use pesticides safely. IPM worked in Indonesia because of a history of severe pesticide overuse by farmers. Although it is not a panacea, IPM certainly will play a role in cutting pesticide use. But pesticides will remain essential to boosting yields for the foreseeable future.

As for Mr. Faeth's last question — how does he know that research on organic farming wouldn't have been throwing money down a rathole? Modern agriculture has undeniably tripled yields and has made it possible for humanity to live better while sparing millions of square miles for wildlife.

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[1] L.R. Oldeman, ed., "Guidelines for General Assessment of the Status of Human-Induced Soil Degradation" (International Soil Reference and Information Centre, Wageningen, Netherlands, 1988). [2] Landrell Mills Research Group, "Organic Farming: Summary of Findings from a Study of Seven European Countries" (European Crop Protection Association, 1992, p. 4).

GERM WARFARE

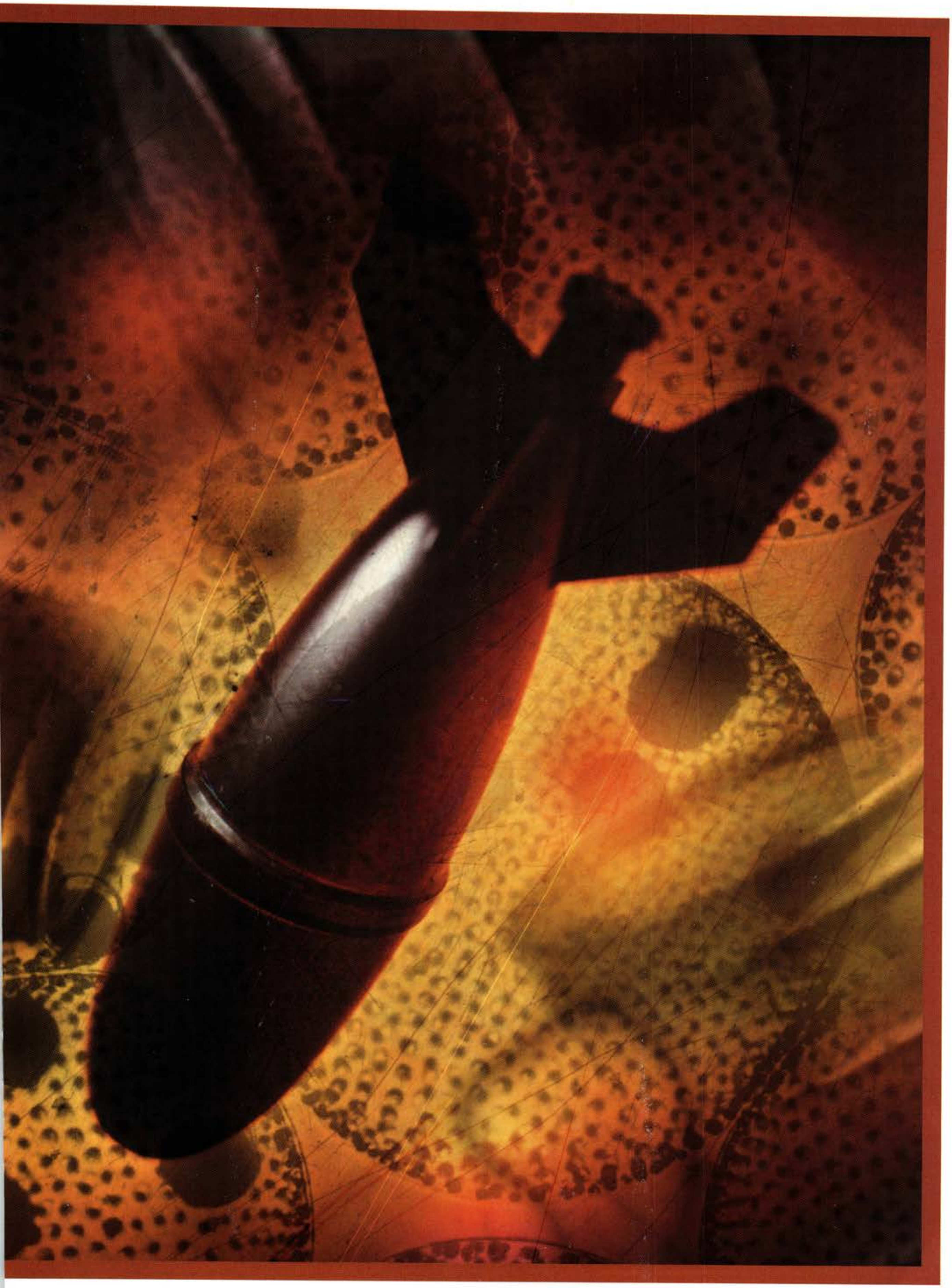
Text by

Jacqueline A. MacDonald

Illustration by Kevin Irby

SOME VENDORS CLAIM THEIR TOXICANT-MUNCHING MICROBES CAN DESTROY A VAST ARRAY OF POLLUTANTS. IS BIOREMEDIATION JUST A MARKETING SCAM, OR A PROMISING CURE FOR FUTURE INDUSTRIAL CLEANUP?

RESIDENTS NEAR THE NOW-CLOSED BAIRD & MCGUIRE chemical plant in Holbrook, Massachusetts, have lived for more than a decade in fear of health threats stemming from contamination by more than 100 chemical compounds — ranging from arsenic to vinyl chloride — of their drinking-water supplies. In 1982, three of the town's drinking water wells and one of its main water reservoirs were closed when the federal Environmental Protection Agency detected contamination resulting from decades of improper waste-disposal practices at Baird & McGuire. Now, many area residents express a new fear: that the EPA's chosen remedy for the site — excavating polluted soil and burning it — will leave much of the contamination in place and may even increase the risk of health problems ranging from reproductive disorders to cancer.



"Incineration is a con job," says James Denning, a retired bus driver who lives near the site and is a member of the Baird & McGuire Citizens' Task Force. Mr. Denning says he originally supported excavating and incinerating the soil over a five-year period, but after studying incineration's efficacy and the depth of chemical contamination at the site, he now believes burning will eliminate just the top layer of pollutants.

A local grassroots group, Citizens Opposed to Polluting the Environment, vigorously opposes incineration, fearing it will release hazardous quantities of pollutants into the air. COPE has lobbied the EPA to consider an alternative cleanup method: *in situ* bioremediation.

In situ bioremediation stimulates naturally occurring microscopic organisms — primarily bacteria — to "eat" and digest contaminants without having to excavate or burn them. ("*In situ*" is Latin for "in place"; "bioremediation" is any type of environmental cleanup technology using microorganisms.) When *in situ* bioremediation works (see "New Life for Tainted Soil," p.57), it is perhaps the most environmentally sound method of cleaning waste sites. While other treatment methods simply move organic contaminants from one medium to another (from water to air, for example, or from water to soil), *in situ* bioremediation can completely destroy pollutants. *In situ* bioremediation can transform organic contaminants into inert byproducts such as carbon dioxide and water without producing waste sidestreams.

But the EPA has rejected citizens' calls for *in situ* bioremediation at the Baird & McGuire site. In 1986 the agency chose incineration as the recommended method of cleanup, partly because of regulatory mistrust of bioremediation at the time. (As is typical at such sites, many years elapsed between the signing of the document and construction of the incinerator, which occurred this year.)

The controversy at Baird & McGuire reflects broader debates now occurring among regulators, scientists, and engineers about bioremediation's value in cleaning up hazardous-waste sites. One bioremediation vendor's brochure touts the technology's advantages: "[it] reduces costs drastically . . . reduces special handling needs required by other technologies," and is "economical to use, easy to use, nontoxic, noncorrosive, nonhazardous, fast working in any soil condition." Why, then, is *in situ* bioremediation used at fewer than 2% of the nation's worst contaminated sites?[1]

Bioremediation Basics

THE PRINCIPLES OF IN SITU BIOREMEDIATION are relatively easy to understand. When toxic chemicals spill on land, they seep down through the soil to the water table, contaminating groundwater. Many types of contaminant-degrading microbes thrive when provided with nutrients and oxygen or an oxygen substitute (usually nitrate or sulfate). However, these compounds are sometimes limited at contaminated sites. By circulating oxygen and nutrients through the site, *in situ* bioremediation systems can cause a population explosion in the native microbial community.

Although chemicals such as benzene and toluene may initially suppress microbial growth, microorganisms adapt quickly, and soon use the contaminant as a food source. Their speedy reproduction allows for swift gene mutation. A well-adapted culture of organisms can double in size in under two hours; a population can increase 100-fold in half a day.

While the process of bioremediation is straightforward, engineering an *in situ* bioremediation system is extremely complex. Typically, engineers use a combination of pumps, vacuum blowers, and devices known as infiltration galleries (which allow nutrients to percolate through the soil) to deliver oxygen and nutrients to the microorganisms below the ground. However, rocks and clays in the subsurface can block the flow of nutrients to the organisms, and training in hydrogeology is necessary for determining the optimum locations for wells and equipment. A background in microbiology is needed to estimate the right formulation of nutrients and oxygen (or oxygen substitutes).

Theory Versus Practice

WHILE SOME FIRMS SELL POWDERS OF dehydrated microbes and nutrient formulations that they claim can be applied to any site, building an *in situ* bioremediation system is much more complex than some marketers suggest.

Some vendors tout bioremediation as a cure for every type of environmental contamination. To date, in situ bioremediation has proved effective on a commercial scale primarily at sites contaminated with easy-to-degrade petroleum products.

One of the early commercial uses of *in situ* bioremediation on petroleum-based chemicals occurred in the early 1980s. An underground storage tank at a gas station in North Babylon, New York, slowly leaked more than 30,000 gallons of gasoline

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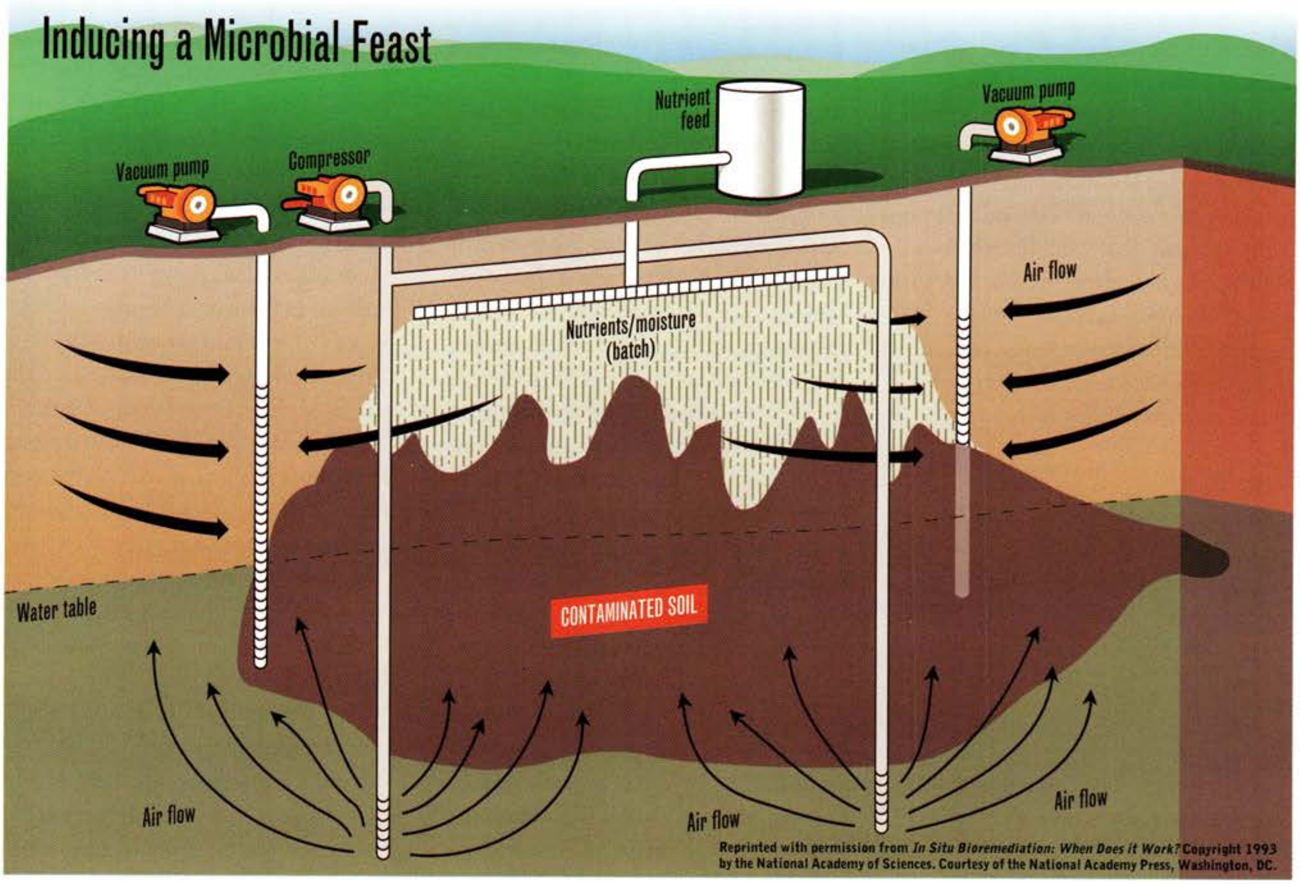
[1] Figures cited by Margaret Kelly, director of the Environmental Protection Agency's Technology Innovation Office, in a HazMat South '94 presentation in Orlando, Fla., February 16, 1994. [2] Michael D. Lee and Richard L. Raymond, "Case History of the Application of Hydrogen Peroxide as an Oxygen Source for In Situ Bioreclamation," in *In Situ Bioreclamation* (Boston: Butterworth-Heinemann, 1991). [3] Committee on In Situ Bioremediation, National Research Council, *In Situ Bioremediation: When Does It Work?* (Wash., D.C.: National Academy Press, 1993). [4] Personal communication with Francis H. Chapelle, U.S. Geological Survey, Columbia, S.C. [5] M. R. Harkness et al., "In Situ Stimulation of Aerobic PCB Biodegradation in Hudson River Sediments," *Science* (Wash., D.C., 1993), vol. 259, pp. 503-507. [6] S. T. Kellogg et al., "Plasmid-Assisted Molecular Breeding: New Technique for Enhanced Biodegradation of Persistent Toxic Chemicals," *Science* (Wash., D.C., 1981), vol. 214, pp. 1133-1135. [7] See note 1. [8] Committee on Ground Water Cleanup Alternatives, National Research Council, *Alternatives for Ground Water Cleanup* (Wash., D.C.: National Academy Press, 1994). [9] U.S. Bioremediation Market, 1994-2000 (DEVO Enterprises, Wash., D.C., September 1993).



Inducing a Microbial Feast

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In an "air sparging" system, a compressor injects air directly into contaminated groundwater. This provides growth-promoting oxygen for aerobic microbes and pushes volatile compounds upwards into the contaminated soil, where they can be collected through a vapor recovery system. Circulating the air also helps disperse the microbe-stimulating nutrient mixture through the water column. Contaminated water is recovered and treated.

into the surrounding soil.[2] Some of the gas leached down into the water table, creating an extensive plume that released fumes into the basements of nearby homes.

Engineers used *in situ* bioremediation to clean up the site, circulating air through the soil with vacuum pumps and pumping hydrogen peroxide (which breaks down into oxygen and water) and a proprietary nutrient solution through the ground water. The influx of oxygen and nutrients expanded exponentially the native microorganism population, which was adapting to a toxic diet. Over an eight-year period, these aerobic microbes degraded nearly all of the gasoline that did not evaporate. Gasoline levels were undetectable at the end of treatment, except in one small, stubborn pocket. Using a traditional "pump-and-treat system" (that requires pumping ground water, removing the contaminants, and recirculating the water back into the soil) would have required a lot of energy to retrieve and clean the water, and it may have left detectable levels of contaminants in the soil.

Bioremediation does have some drawbacks. Many sites contain contaminants, such as chlorinated solvents and polychlorinated biphenyls (PCBS), that have more complex structures which resist biodegradation — requiring manipulation of environmental conditions to nuture specialized microbial populations. A recent report by the National Research Council, the scientific advisory institution that carries out studies on behalf of the National Academy of Sciences, cautions that "bioremediation treatment technology is well established for certain classes of petroleum hydrocarbons but . . . the technologies for treating all other classes [of contaminants] are still emerging."[3]

In situ bioremediation *potentially* can treat almost any hazardous chemical. The art is in engineering systems to stimulate growth of microbes capable of surviving on the most toxic compounds. U.S. Geological Survey researchers have demonstrated that microorganisms native to a former munitions manufacturing facility in Weldon Springs, Missouri, are thriving on a diet of trinitrotoluene (TNT), which they convert to carbon dioxide;[4] researchers working for General Electric have

JOHN VAN PELT

shown that microorganisms native to Hudson River sediments can be manipulated to digest PCBS.[5] Other scientists have even bred microbial strains capable of degrading 2,4,5-trichlorophenol, one of the two active ingredients in Agent Orange, which until recently was thought to be non-biodegradable.[6] However, the NRC insists that more field tests and basic research are needed to design effective systems for treating most non-petroleum contaminants.

False Claims

SOME TECHNOLOGY VENDORS MARKET *in situ* bioremediation as a guaranteed panacea for eliminating a broad range of problems. Indeed, the Achilles' heel of bioremediation systems may be salespeople who promise more than current technology can deliver. Robert Hinchee, senior research leader at Battelle Pacific Northwest Laboratory and editor of a highly regarded book, *In Situ Bioreclamation: Applications and Investigations for Hydrocarbon and Contaminated Site Remediation* (Butterworth-Heinemann, 1991), says "by its nature, bioremediation is a black box technology, leaving it vulnerable to snake oil salesmen."

Joe Salanitro, a senior research microbiologist at Shell Development Company, says that high-level environmental managers are regularly approached by bioremediation hucksters promising cheap solutions to the company's contamination problems. Dr. Salanitro spends a significant portion of his time explaining to his managers why the seller's products will not work. In one case, he recalls, someone attempted to sell Shell a powder of microorganisms reputed to eat pure tar — a physical impossibility, since the microscopic creatures in bioremediation systems require water to live, and pure tar contains none. (Microbes *can* degrade components of tar dissolved in water.)

Instances of failed bioremediation projects involving bogus vendors are numerous. One example: an attempted cleanup at the Miami airport, where a poorly designed bioremediation system created a plume of contaminants more troublesome than those originally present. Thousands of gallons of jet fuel had leaked from "fill lines," pipes that deliver fuel from above-ground storage tanks to remote locations where airplanes are refueled.

The airport hired a consulting firm to design a bioremediation system. They installed a system that circulated nutrients, but no oxygen, through the contaminated soil and water. Because jet fuel is easily degraded, the native microbial inhabitants at the site went to work on it even without extra oxygen, quickly consuming all of the oxygen naturally present and creating an anaerobic (oxygen-free) environment. This enabled organisms known as methanogens (meaning "methane generators") to thrive. After overtaking the aerobic bacterial population, they ate the rest of the jet fuel. But instead of converting it to carbon dioxide (as oxygen-using microbes would have done), they converted it to methane. The buildup of methane, an odorless, highly flammable gas, forced airport authorities to close the terminal.

Eventually the firm vented the site, allowing methane to escape and the airport to reopen, but bioremediation was discontinued. The company that designed this system was a large engineering firm that claimed to have expertise in bioremediation, according to Dr. Richard Brown of Groundwater Technologies, Inc., and a coauthor of the NRC report.

Underused Technology

WHILE BIOREMEDIATION IS OVERSOLD through erroneous claims, it is at the same time underused. Dr. Brown says that *in situ* bioremediation should be employed more often in combination with other technologies to speed cleanup and achieve lower contaminant levels. It could also be used at more sites contaminated with petroleum products. Kate Devine, an industry analyst and publisher of *Biotreatment News*, estimates that *in situ* bioremediation is used to clean up fewer than 2% of all leaking underground storage tanks. Similarly, the technology is practiced at fewer than 2% of Superfund sites (those ranked by the EPA as highest priority for cleanup).[7] While many Superfund sites contain complex mixtures of wastes that may be difficult to degrade in place (given current technology), sites with leaking underground storage tanks often contain degradable petroleum products, making them ideal candidates for *in situ* bioremediation.

The limited use of *in situ* bioremediation may be a delayed result of historic regulatory mistrust of the technology. "Most regulators are engineers, and engineers like boxes — mechanical things with valves to adjust," says Bill Mahaffey, a microbial biochemist at ECOVA Corp. and coauthor of the NRC report. Designing an *in situ* bioremediation system requires more trial and error than engineering other technologies, and these systems can't be manipulated by simply adjusting mechanical valves.

Many in the bioremediation business believe that the federal government should develop licensing requirements for bioremediation practitioners to prevent the technology from being discredited before it has reached its full potential. Dr. Mahaffey says that for bioremediation to work, the cleanup firm and the company responsible for the contaminated site should have a doctor-patient relationship. Allowing bioremediation vendors to go unregulated is "like allowing drug companies to sell drugs to patients without prescriptions," he says.

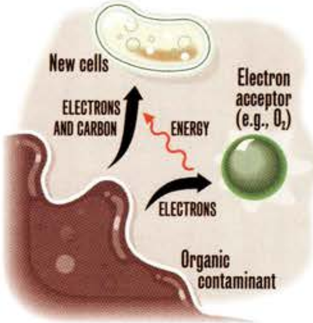
Talk of regulation is taking on

greater urgency, as the market for bioremediation technologies has surged over the past decade. Ten years ago, only about five companies offered bioremediation; today, more than 100 firms advertise their expertise.[9] Growth in the hazardous-waste cleanup market has slowed in recent years. But Ms. Devine expects bioremediation to increase its share of the waste-cleanup market over the next decade. Estimating the 1993 bioremediation market was between $160-$190 million, she predicts the market will expand to between $220-$390 million by the year 2000, a potential increase of up to 140%.

Such market growth is an outgrowth of bioremediation's appeal, a low-cost technology that treats contaminants in place. With the price tag for purging a major hazardous waste site running in the tens of millions of dollars (the estimated cost at Baird & McGuire is nearly $50 million), reducing costs is a top priority for industries financing cleanup. An NRC report estimates that using *in situ* bioremediation instead of conventional technologies to treat a relatively small, hypothetical site contaminated with benzene would reduce costs by about 40%.[8] The cost savings for cleaning up a site the size of Baird & McGuire, if that were possible, could be in the tens of millions of dollars.

New Life for Tainted Soil

In situ **bioremediation is as old as the planet. Whenever a leaf falls or you throw an apple core on the ground, the remains are "treated" by *in situ* bioremediation. Microorganisms native to the soil use the natural world's detritus as their food source. In the process of consuming the wastes, microorganisms return beneficial nutrients to the soil. While degrading toxicants, microbes accumulate energy by breaking chemical bonds. The contaminant (or "electron donor") is diminished — transferring electrons to an "electron acceptor," often oxygen. The energy produced is then "invested" (along with some electrons and carbon from the contaminant) to produce more cells. Without this natural *in situ* bioremediation, Earth would literally be buried in wastes.**



Humans have been engineering bioremediation processes to treat sewage since the early part of this century. Whenever you flush a sewer-line-connected toilet, waste water travels to a municipal treatment plant, where it is routed through settling tanks to remove solids. The liquid is then sent through a tank containing a high concentration of microorganisms that break down the remaining waste. *In situ* bioremediation differs only by degrading wastes (which have spilled accidentally or through improper disposal practices) in place, without moving them to a special treatment unit.

When designing *in situ* bioremediation systems, engineers attempt to speed the growth of organisms inhabiting the contaminated site (and hence the rate at which contaminants biodegrade) by providing them with an ideal environment. Organisms are supplied with oxygen (if they require it), nutrients, and whatever other substances are necessary to encourage growth.

The first attempt to engineer an *in situ* bioremediation system for treating hazardous waste was in 1972, at a Sun Oil pipeline spill in Ambler, Pennsylvania. Between 1972 and the early 1980s, just one to two dozen *in situ* bioremediation systems were built, most with the involvement of Sun Oil Company microbiologist Richard Raymond. Now that engineers have developed more effective ways of circulating oxygen through contaminated sites, these systems number in the hundreds.

BACK AT THE BAIRD & MCGUIRE SITE, THE incinerator stands ready to begin burning nearly 200,000 tons of soil contaminated with dioxin and 101 other toxic chemical compounds. However, test burns scheduled to begin in July were put on hold by EPA regional director John P. DeVillars, after preliminary results of an EPA study that linked even small amounts of dioxin to ailments such as depression of the immune system, reproductive problems, and damage to fetal development. Local regulators fear that by burning the soil on site, tiny amounts of dioxin could become airborne. The incinerator could sit idle for the next 18 months, while the EPA completes its dioxin reassessment. Even if incineration is eventually employed at the Holbrook plant, *in situ* bioremediation is still the preference of many local citizens for cleaning up contaminants that could remain after burning.

Would *in situ* bioremediation be the right choice for Baird & McGuire? Answering this question would require a detailed diagnosis by an expert — and legitimate — practitioner of this technology. Given that the site contains more than 100 contaminants — from metals to pesticides — and the fact that *in situ* bioremediation has so far been used commercially almost exclusively at petroleum-contaminated sites, it's unlikely that a stand-alone system could remove all of the contamination. However, as research results continue to mount and scientists gain control of the technology, *in situ* bioremediation may become part of a sequence of technologies to treat such complex sites in the near future. But without industry oversight, bioremediation — which the NRC calls "a technology whose full potential has not been realized"— may be robbed of its promise by vendors whose false claims undermine its legitimate successes.

JOHN VAN PELT

STEVE TROMBULAK

Wanted: Honesty in Enviro Debate

IMAGINE FOR A MOMENT THAT YOU ARE at a conference on the ecological consequences of timber-harvesting practices in North America. Several papers have been presented on the effects of clearcutting on neotropical migrant songbirds. Later that day, you overhear two environmentalists talking in the hall.

A: *Did you hear the talk by Smith?*
B: *Yes. I just can't believe that the migrant songbirds aren't affected by clearcutting. We know clearcutting is bad. There must be an effect.*
A: *I agree, but I'm not surprised. The study was funded by the timber companies. I'm sure they swayed the results.*
B: *We should prepare some kind of rebuttal to the study.*
A: *You're right. Also, let's talk about the other organisms that live there. If it isn't birds that are affected, it must be something else like salamanders.*

In my experience, the attitudes expressed in this dialog are rather typical. But they are counter-productive to the environmental movement. While I completely support the mission of protecting and restoring biotic diversity on Earth, we need to be very careful about interpreting ecological studies and using only the data we "like" while disregarding data at odds with our preconceptions.

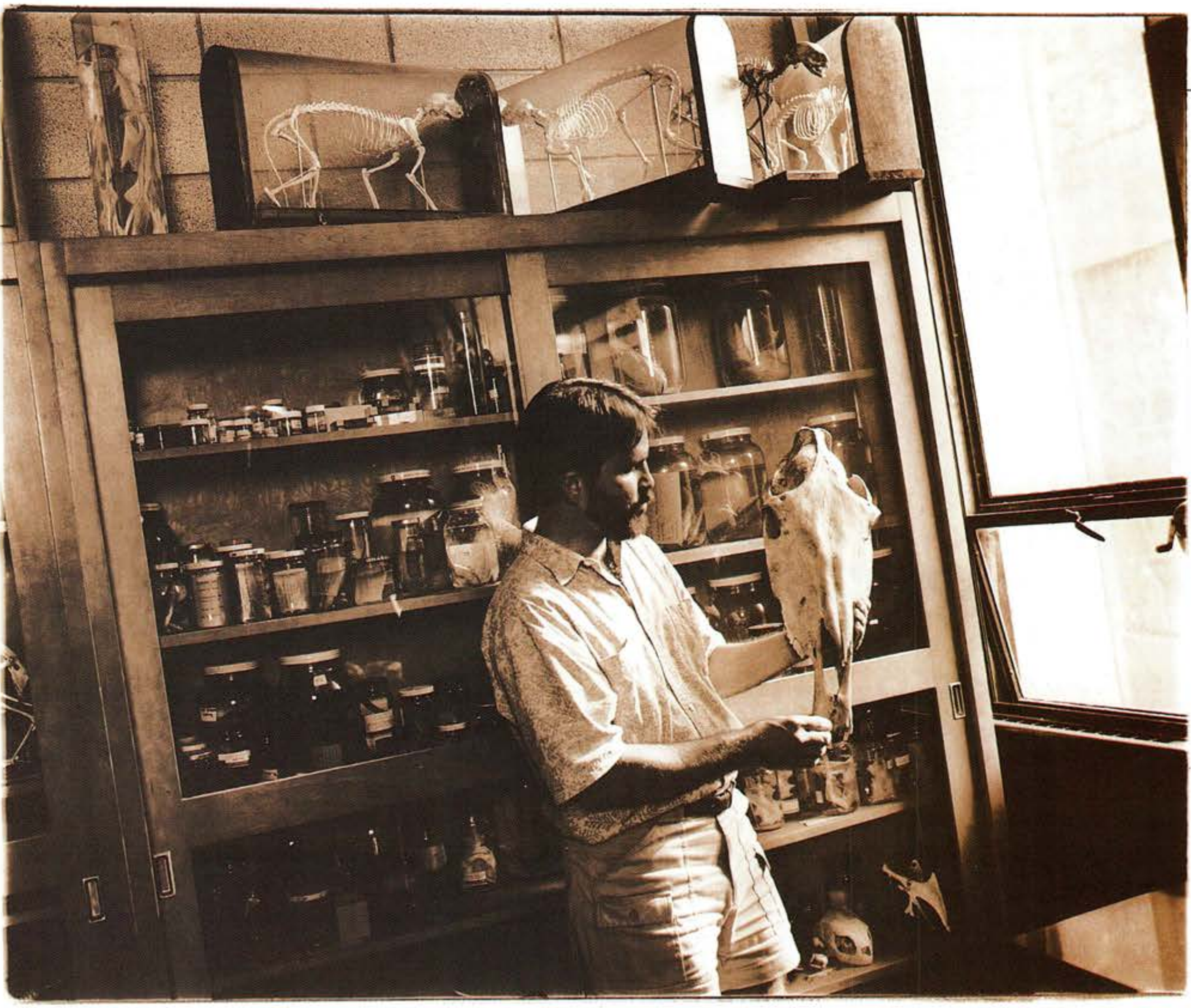
The conversation above reflects three fundamental errors that work against efforts to restore biotic integrity to the world. The first is the notion that because the timber industry funded the research, the results must be biased or fabricated. Maybe they are, but it's a bad assumption. It implies that the scientists doing the work were dishonest or ignorant — very serious accusations. Conversely, research done by scientists sympathetic to the environmental movement may be ignored because that work too is potentially biased. The resultant war of experts would lead to scientific research being discounted in policy debates, since both sides would dismiss data based on who collected it — rather than on its technical merits.

"Environmentalists have prejudged what 'must' be right. Forget what the data say; intuitively we 'know' what should be happening. This kind of pseudoscientific analysis must be avoided at all costs."

The second, more serious error is the assumption that if birds (for example) are not negatively affected, then something else "must" be. The result is we've created a moving target for our predetermined portrait of a restored ecosystem. Imagine this scenario: For years the environmental community argues that timber-harvesting practices are bad because they cause a decline in neotropical migrants. Environmentalists create the public perception that this is the only reason why timber harvesting should be regulated. Never mind that scientists acknowledge multiple problems associated with habitat destruction. In public debate, birds have been highlighted as a central indicator of forest health. When credible data emerge that birds are in fact not threatened, the impression left is that all is well. If environmentalists react to this discovery with "Oh yeah, well maybe it doesn't hurt birds, but it hurts (for example) salamanders," we send a two-fold message that we don't know what we're talking about, and we don't know what will make us happy. Shouldn't we be pleased if birds are not hurt by timber cutting? It seems not, because our reaction is merely to move on to the next taxon that we can fret over.

The third and greatest problem with the hypothetical conversation is that we have prejudged what "must" be right. Forget what the data say; intuitively we "know" what should be happening. This kind of pseudoscientific analysis must be avoided at all costs. At best, it wastes a great deal of time. At worst, it prevents us from focusing on information that might lead to meaningful insights and effective solutions.

Consider the global decline of amphibians. Many species of amphibians have shown drastic population declines. The scientific community has argued that amphibians are under some kind of environmental pressure, possibly caused by humans, that may result in the global extinction of amphibians as a group. So the environmental community happily adopts amphibian decline as another casualty of human encroachment.



PHOTOGRAPH BY *William Huber*

Recently, however, results from a 12-year study in South Carolina show that increases and decreases in density are a natural part of the demographics of amphibian populations in this area, casting doubt on the argument that global amphibian declines are related to human activity. Should environmentalists dismiss this study because it doesn't conform to their generally accepted beliefs? I think not.

Ponder what the results from South Carolina suggest. Booms and busts, local extinction and recolonization, may well be natural to the demography of amphibians. This could mean the global decline is not due to local extinction of amphibian populations, but rather the lack of reestablishment of populations following local extinction. That helps clarify the real, ultimate danger to amphibians — habitat fragmentation, and disruption of metapopulation structure — which is an observation that might not be apparent if the data were ignored because they did not conform to what we thought we should see.

I do not mean to imply that in science, intuition is useless. Many theories derive from an intuitive feel for what might be true. But intuition must then be validated by careful — and honest — tests of the theories.

We should never cease challenging the results of scientific studies. That, after all, is part of the scientific method. But we should be careful about why we challenge the results. If we attack data solely out of emotional bias, we run the risk of omitting what's important, and committing one of the sins we most abhor in our opponents.

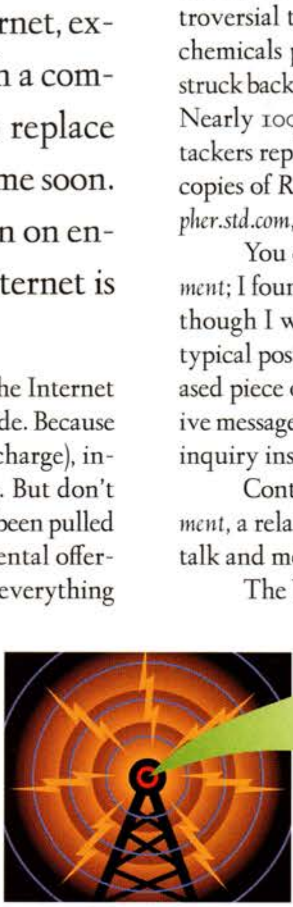
STEVE TROMBULAK, *a professor of biology at Middlebury College, is the associate editor of mammalogy for* American Midland Naturalist *and a contributing editor to the* Northern Forest Forum. *This article was adapted with permission from* Wild Earth *(Winter 1993/1994), P.O. Box 455, Richmond, VT 05477.*

RECOMMENDED DAN KENNEDY

Cruising Envirospace

CONTRARY TO WHAT YOU MAY HAVE gleaned from breathless media accounts about the Internet, exploring cyberspace with a computer and modem is not going to replace spending a day at the library anytime soon. For researchers seeking information on environmental issues, though, the Internet is a good place to start.

Through thousands of small networks, the Internet links as many as 30 million computers worldwide. Because its structure is non-hierarchical (no one is in charge), information is scattered throughout cyberspace. But don't worry: Much of that data will appear as if it's all been pulled together for you, so it's easy to use. Environmental offerings are abundant and often free — including everything discussed in this article.



If you've been surfing the Net for some time, no doubt you already know how to use basic Internet tools like e-mail, telnet, gopher, ftp, and Usenet. If not, I recommend Tracy LaQuey's *The Internet Companion* (Addison Wesley, 1992), a short introductory book that will quickly get you up to speed. If you want to dig deeper, Ed Krol's best-selling *The Whole Internet User's Guide & Catalog* (O'Reilly and Associates, 1992) is outstanding.

SO NOW YOU'VE LOGGED ONTO THE INTERNET. WHAT'S NEXT? PERhaps the most useful outpost is the Usenet newsgroup *sci.environment*, one of more than 10,000 interactive discussion groups devoted to everything from bestiality to quantum mechanics. Subscribe to *sci.environment* and you can keep up with the ongoing debate within the environmental community and, to a lesser extent, between environmentalists and their critics. A dozen or more messages are posted daily.

In *sci.environment*, for instance, you'll find *Rachel's Hazardous Waste News*, published by the Environmental Research Foundation of Annapolis, Maryland. This past summer, shortly after the *New York Times* printed a profile of controversial toxicologist Bruce Ames (he believes synthetic chemicals play almost no role in causing cancer), *Rachel's* struck back with an entire issue devoted to whacking Ames. Nearly 100 scientifically literate Ames supporters and attackers replied in a stimulating debate. (Current and back copies of *Rachel's* can be found, among other places, at *gopher.std.com*, under "Publications, Magazines, and Journals.")

You can also post your own messages to *sci.environment*; I found that helpful for researching this article, even though I was flamed by a few anti-GARBAGE greenies. (A typical posting: "you poor bastard . . . working for that biased piece of garbage." I also received a couple of supportive messages, including one from an academic who said my inquiry inspired him to subscribe.)

Containing many of the same postings as *sci.environment*, a related newsgroup, *talk.environment*, offers less tech talk and more granola.

The University of Virginia and the EnviroLink Network, in Pittsburgh, have dug gopher holes for the express purpose of linking every environmental organization and database they can find. Gophers are easy-to-use, menu-driven interfaces that greatly simplify the task of exploring the Internet. To access UVirginia's EcoGopher, type "gopher *ecosys.drdr. virginia. edu*"; the address of EnviroLink's effort, known as EnviroGopher, is *envirolink.org*. There's a great deal of overlap, and each gopher contains links to the other. With its academic orientation, EcoGopher is more comprehensive than EnviroGopher, but both provide almost one-stop researching.

Among the most useful of EcoGopher's hundreds of features: a water quality database with several hundred technical publications from the Purdue Cooperative Extension Gopher; numerous bibliographies and publications; and the League of Conservation Voters' detailed ratings of every member of Congress. EcoGopher also enables you to do a key word search of every bit of text on the gopher. EnviroGopher's top menu is somewhat better organized than

ILLUSTRATION BY *Jeffrey Pelo*

EcoGopher's, but as of press time the rest of this resource was still under construction.

The Environmental Protection Agency's own gopher (*gopher. epa. gov*) promises to offer policy statements, press releases, rules and regulations, searchable databases, and other useful stuff, but much of it is still being assembled. One item that is up and running, the EPA *Journal*, has articles on topics such as environmental tobacco smoke, sick-building syndrome, and radon. Other federal gopher holes include those offered by the National Institute of Environmental Health Sciences (*gopher. niehs. nih. gov*) and by the Occupational Safety and Health Administration (*ginfo. cs. fit. edu*).

Want to seek out more-obscure Internet sites? One good beginner's resource is "Environmental Sources on the I-Way," a bibliography of bibliographies by Margeaux Schwartz, a student at Wright State University. (Send e-mail to her at *s007mxs@desire.wright.edu*.)

Once you've spent some time on the Net, you'll probably notice that those who question environmentalist orthodoxy are practically an endangered species. You'll find some skeptics in *sci.environment*, but most of them are libertarians and right-wingers posting anti-environmentalist political screeds. Asked why the greens seem to dominate cyberspace, a Garbage-basher responds: "The antis already have the *New York Times*, *Nightline*, *U.S. News and World Report*, the *Christian Science Monitor*, *Reason*, the *Wall Street Journal*, George Will, Rush Limbaugh, and Garbage. Why would they mess around with marginal media like the Internet, which hardly reaches anyone by comparison?"

I did find one source of contrarian research worth checking out: a mailing list offered by the Competitive Enterprise Institute, a Washington-based think tank that has criticized the ban on chlorofluorocarbons, the opposition to recombinant bovine-growth hormone (RBGH), and the EPA's enthusiasm for ethanol. These are essentially op-ed columns with an economic orientation, but it's possible to glean some scientific data from them. To subscribe, send e-mail to *cei@access.digex.com*. The body of the message should say "subscribe ceilist," followed by your e-mail address. Archives can be accessed by anonymous *ftp at ftp.digex.net*. The path is /pub/access/cei.

Clearly, though, there's a compelling need for more balanced, scientifically based information on the Net that reflects differing points of view.

DAN KENNEDY (*dkennedy@world.std.com*) *is news editor of the* Boston Phoenix, *for whom he writes "Cyberwatch," a nationally distributed column on information technology.*

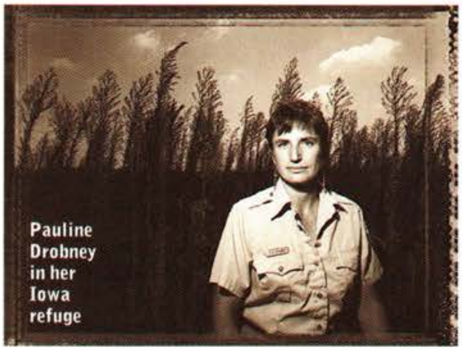
RESTORATION PAULINE M. DROBNEY

Rebuilding a Pre-Pioneer Prairie

AS A CHILD GROWING UP IN THE PRAIRIE flatlands of Pocahontas County, I learned early that the wealth of Iowa's farm economy was rooted in our soil. One of my earliest jobs was "walking beans," pulling or cutting the thistles, buttonweed, and rogue corn growing among the soybeans on some of the earth's most productive soils. Like most Iowans, I was unaware that the source of the sweet-smelling, black soil that oozed between the toes of my often-bare feet was prairie.

Today, less than 0.1% of the original 35 million acres of prairie and savanna (a mix of grassland and fire-tolerant trees) still exist in Iowa. These virgin lands are mostly nestled in silty hills along the Missouri River, where deep deposits of windblown soil formed rugged hills too steep and dry for farming. Conservation efforts are important in preserving the genetic and species diversity found in these ecologically unique remnants; however, protecting these hills does not answer the urgent need for preserving fragments in heavily farmed regions of the Midwest.

The Walnut Creek National Wildlife Refuge and Prairie Learning Center, 20 miles east of Des Moines, marks an ambitious effort by the U.S. Fish and Wildlife Service to rebuild in the agricultural Midwest a portion of the tallgrass prairie and savanna ecosystem that is large enough for long-term viability. The refuge was launched in 1991 with the purchase of a 3,600-acre site once slated for development into a nuclear power plant. About 5,000 acres, two-thirds of the 8,654-acre refuge acquisition goal, has been purchased from farmers and other willing landowners.


Pauline Drobney in her Iowa refuge

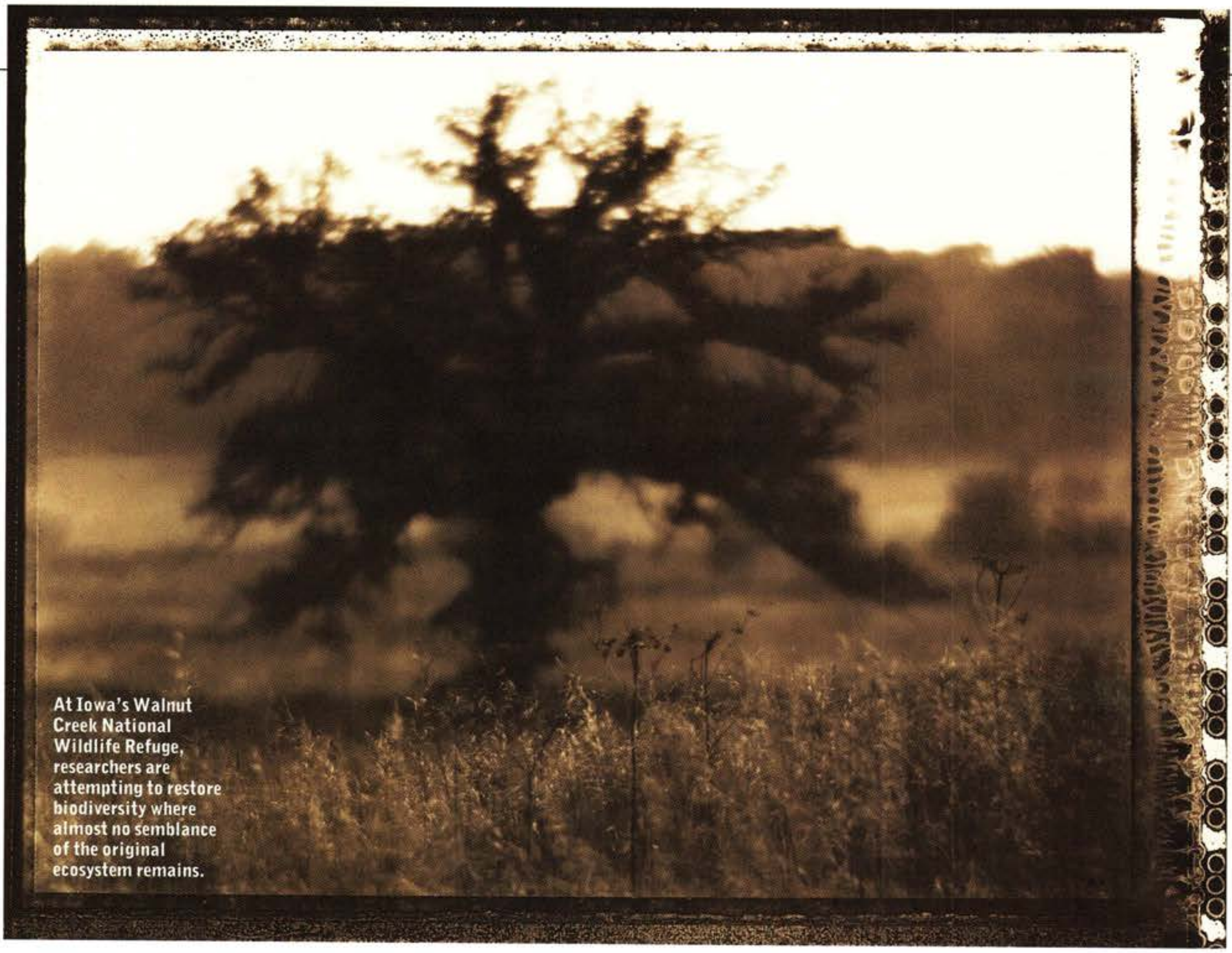
The land within the refuge's acquisition boundary is *not* currently rich in native biodiversity. In fact, it is mostly "farm ground" and, as such, does not even rate on most scales of ecological significance. However, islands of prairie and savanna fragments are scattered throughout the refuge. The largest and most diverse plots are in the northern section, where prairies were historically dominant. Preserved by accident, not design, these remnant plant communities are a testament to the resiliency of an ecosystem that evolved through thousands of years to adapt to local conditions.

However, 150 years of plowing has robbed Iowa's soil of organic matter that was previously provided by the 15-foot-long roots of grasses and other indigenous plants. Farming-induced erosion has allowed the dark, rich prairie topsoil to run off into valleys or be carried south — sometimes as far away as the Gulf of Mexico — by swift running irrigation canals. Invasive non-native weeds have choked out indigenous plant species. Carrier pigeons, which once darkened Iowa's sky, are extinct; herds of bison no longer roam the prairies.

A primary goal at the refuge, then, is to emulate — not replicate — the landscape that existed prior to Euro-American settlement. Given the human-induced changes in the ecosystem, replication is beyond our ken.

THE REFUGE SPREADS ACROSS A THREE-BY-FIVE-MILE RECTANGLE. General Land Office surveyors' notes from 1848, soil information, and other historical documents indicate that the flat-to-rolling landscape that existed in its northern section was probably open prairie. The southern section probably consisted of a mosaic of prairie, savanna, and wet prairie or sedge meadow.

To begin our prairie emulation, we had to develop a way to obtain seed from local remnants, because seed for natives such as creamy gentian, purple love grass, and spotted St. John's wort were not available commercially. Just a few prairie and savanna sites were known in southern Iowa, so with the help of the Iowa Cooperative Fish and Wildlife Research Unit, we enlisted five "seed seekers" who spent two months identifying 410 natural community remnants for seed harvest.



At Iowa's Walnut Creek National Wildlife Refuge, researchers are attempting to restore biodiversity where almost no semblance of the original ecosystem remains.

PHOTOGRAPHS BY *Paul Elledge*

In addition to hand-collecting seeds, which results in a relatively clean yield for specific seed mixes and production plots, we also harvested larger quantities by machine. Custom contractors collected seeds with altered combines, a modified Kentucky bluegrass stripper, hand-held weed eaters recast with brush heads (to sweep seeds into a bag), and other mechanical innovations. The machines worked well, and nearly all left standing plant material for wildlife habitat.

Over the past two years, hundreds of volunteers and school groups have helped our staff plant nine tons of seed-containing matter across 800 acres of the refuge. For fear of further soil erosion, we did not prepare the soil by tilling. We sowed seed by hand, deposited them in neat furrows with a seed drill, or shot them through the pressurized tubes of an airseeder before packing them into raked ground.

NOTHING TEACHES YOU ABOUT THE COMPLEXITY AND VALUE OF an ecosystem so thoroughly as attempting to restore biodiversity at a site on which almost no semblance of the original ecosystem remains. Collecting and planting seeds, pulling sweet clover, girdling trees, and clearing brush on 5,000 acres combines hard work, recreation, and learning. Maybe our late valuation of the prairie is a peculiarity of our species to cherish rare things. Our veteran volunteers tend to view their home landscape with a new eye, looking for evidence of prairie and savanna. Often they will find, or ask us to help them find, a prairie or savanna remnant near their home that they can nurture or use to collect seeds for the Walnut Creek refuge. The refuge continues to be their reference point, but their experiences with restoring native ecosystems begin to expand beyond Walnut Creek's borders — sometimes taking in their own neighborhoods.

PAULINE DROBNEY *is a refuge biologist at Walnut Creek National Wildlife Refuge, P.O. Box 399, Prairie City, Iowa 50228. This article was adapted with permission from the Summer 1994 issue of* Restoration and Management Notes.

ASK GARBAGE

ANDREW BRENGLE & LISA SMITH

This might be oxymoronic, but are there any ways to conserve gasoline while driving my car?

GWEN RILEY, RALEIGH, N.C.

YES. HERE ARE SOME PRACTICAL TIPS:

- The American Automobile Association says that you don't need to pump the accelerator before starting newer, fuel-injected cars and trucks. Maintaining a steady speed on the highway also saves gas, so AAA touts the benefits of cruise control and driving within the speed limit.
- Cars with automatic transmissions use more gasoline than those with manual transmissions, although fuel conservation is dependent on the driver's ability to handle a clutch and a stick shift.
- Those who warm up their car on a cold winter morning may be surprised by Tom and Ray Magliozzi's (of National Public Radio's "Car Talk" fame) suggestion to drive away immediately after starting the engine. Extended idling eats up gas (between a half-gallon to a gallon of gas per hour). Even turning your car off and restarting it wastes less gas than idling for more than a minute.
- Keeping a vehicle tuned up is also critical to saving fuel. Spark plugs should be replaced regularly, ignition timing and idling speed should be set to specification, and oil should be changed every 3,000 to 5,000 miles. Underinflated tires can cut fuel economy by as much as 2%.
- In an effort to reduce gas usage, the United Parcel Service adopted a plan to educate its employees. Among the fuel-saving suggestions: shift into the next highest gear as soon as possible; accelerate smoothly from a stop; pace yourself in traffic; and anticipate traffic signals to avoid sudden stops. UPS reports that in 1993 its fleet of 52,495 gasoline-powered vehicles reduced fuel consumption by more than 3.1 million gallons — a 67% increase over its 1992 fuel savings of 2.3 million gallons.

What is the pesticide they spray on some international flights? Is it harmful?

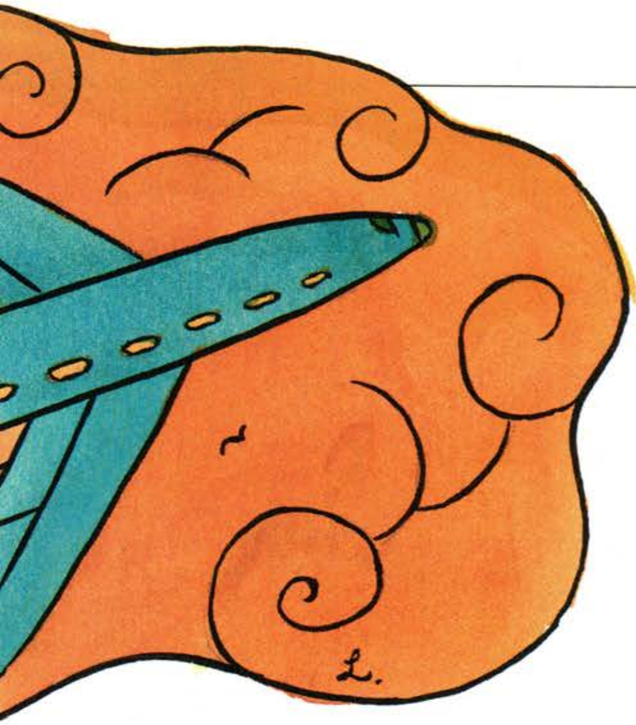
KIM PETERSON, TIMONIUM, MD.

D-PHENOTHRIN (TRADE NAME: SUMITHRIN) IS THE ACTIVE INgredient likely to be sprayed in the cabin of an international flight while it is in the air or just after landing. This synthetic substance mimics the insecticidal properties of pyrethrin, a chrysanthemum extract. Some foreign governments require spraying on incoming international flights to kill stowaway pests. The Airosol Company of Neodesha, Kansas, is the only U.S. manufacturer that distributes the pesticide to airlines in this country and one of only three companies doing so worldwide, according to Airosol president Carl Stratemeier. Airosol Aircraft Insecticide (the product's brand name) is also sold by the Airosol Company as Black Knight Roach Killer. The two products are identical in chemical composition and concentration.

Judgment on whether d-phenothrin is harmful is mired in a classic debate pitting anecdotal evidence and intuition against toxicological data that says d-phenothrin is *not* a threat to the vast majority of airline passengers.

Toxicological tests of d-phenothrin on lab animals show low toxicity in the short and long term, even at doses many times stronger than that used in the spray, according to Dr. Jerome Blondell, an epidemiologist with the EPA. While the spray contains 2% d-phenothrin, lab animals exposed to as much as an 86% solution showed few or no

PHILIPPE LARDY



effects. But questions remain for allergy-prone and chemically sensitive humans.

The EPA has called in updated toxicological data on d-phenothrin, data the agency has yet to finish collecting and assessing. The EPA does not consider airline pesticide spraying a danger to the average passenger, but Robert Brennis of the agency's pesticide registration division says, "nobody has shown us that airline spraying is *necessary* with people on board." It is uncertain whether spraying even eliminates most of the targeted pests. Mr. Brennis adds that in response to pesticide-related complaints of passengers and airline attendants, the Clinton Administration has urged over 20 foreign countries — mainly in South America, the Caribbean, and the South Pacific — to stop requiring the spray.

Diana Fairechild, author of a book on healthy flying titled *Jet Smart* (Flyana Rhyme, Inc., 1992), has some tips for chemically sensitive people wishing to protect themselves from insecticidal fall out. First, ask the chief flight attendant if and when spraying will occur. If the cans come out in mid-flight, cover up with a blanket until the spray has time to settle and dissipate — perhaps a minute. If, as in some countries, a "spraying crew" boards after the plane has taxied to the gate, you can exempt yourself with a doctor's note explaining that you are "allergic to pesticides, asthmatic, or pregnant."

Write to: Ask Garbage, 2 Main Street, Gloucester, Mass. 01930

I noticed that GARBAGE has switched from paper with a matte finish to paper with a glossy finish. Isn't this coated paper worse for the environment?

DOUGLAS SEEFELDT, LITTLETON, COLO.

MOST LIKELY YOU'RE ASSUMING THAT THE MAGAZINE WILL BE recycled and that it is more difficult to separate the clay coating (which makes the paper glossy) from the paper fiber in our new paper stock. This is true. Old, uncoated paper is more easily reprocessed for paper production than its clay-coated cousin.

To produce a high-quality recycled magazine paper containing post-consumer waste, manufacturers take great care in choosing the materials that enter the paper pulper for de-inking. Magazines are an undesirable raw material for high-grade paper recycling because the clay-coated paper requires high-tech pulping and washing to remove the inks, and they produce a sludge byproduct requiring disposal. And since the price of recycled paper is based on weight, papermakers desire the most "fiber-dense" raw material: used, white, *uncoated* office paper.

GARBAGE has been printed on recycled stock since its inception in 1989. We were pioneers in the magazine publishing industry, one of the first to employ stock containing recycled content — in our case, Cross Pointe Troy Book 60-lb. that contained a minimum of 15% post-consumer waste.

But printing on uncoated recycled stock was tricky because it tended to absorb some of the ink and stretch from the moisture. And high-speed web presses, the kind that magazines are printed on, initially waste some paper while the color tone and alignment of the four plate colors are being fine tuned for the complete printing run. Since *coated* paper doesn't absorb wet ink and expand, adjusting the alignment and color takes less time and wastes less paper. Although our new coated paper contains a little less recycled fiber per pound than our old paper, we are saving resources and money by using less paper overall.

GARBAGE continues to provide a demand for recycled paper — our new stock, Miraweb II Dull, contains at least 50% recycled fiber, including a minimum of 10% post-consumer waste paper.

IN THE DUMPSTER BILL BREEN

NRC Nukes Inspections

YOU WOULD THINK THAT IN THE wake of public hysteria over the 1979 accident at Three Mile Island, the Nuclear Regulatory Commission would intensify its inspections of commercial nuclear-power plants. Think again. ◆ A recent audit by the NRC's Inspector General David Williams reveals the agency has relaxed the program designed to keep substandard parts out of the nation's nuke plants — even though earlier inspections uncovered problems having "significant safety implications." In doing so, the NRC reneged on its pledge to Congress to make regular inspections to ensure that parts such as pipe flanges, bolts, and fuses are tough enough to keep functioning through an accident.

Concerns about below-standard parts began to arise in the early 1980s, as the number of certified, nuclear-grade vendors began to decline and utilities increasingly made their purchases on the commercial market. Nuclear-safety advocates complained to the NRC that some commercial parts, which must be tested and inspected, were substandard and possibly counterfeit. But regulators were skeptical, according to the audit, and "did not aggressively determine whether a problem existed." Two internal investigations into problem parts were even stymied by NRC higher-ups.

PAUL TAYLOR

Prodded by citizen watchdogs, a 1990 investigation by Congress' General Accounting Office found that more than 60% of the nation's 107 nuclear power plants were either operating with substandard parts in their safety systems or had them in their inventories. Finally, the NRC conducted its own "quality assessment" examinations of 13 utilities. Twelve of them flunked. Regulators conceded that "unchecked, the problem could have an impact on nuclear-plant safety."

But in a confounding piece of illogic, the NRC decided the parts problem was so pervasive it needed to suspend regular inspections. The agency reasoned that utilities required time to locate and replace bad parts. The GAO criticized the move, rightly arguing that the NRC was "reducing its regulatory influence over the nuclear industry."

The agency promised Congress it would resume routine inspections in late 1991. It never did. Why not? Industry analysts told the *Christian Science Monitor* that the bogus parts problem is so widespread, the NRC would have to force numerous shutdowns so utilities could replace key parts. Instead, the agency launched a new policy — without informing Congress — which merely requires inspections when a performance problem arises. (The NRC says it will explain to Congress by Dec. 1 its reasons for changing the inspection policy.)

The NRC isn't doing the nuclear industry any favors. Findings that more than half of the nation's nuke plants may be rife with substandard parts will only fuel the public's phobia of all things nuclear. Worse, by not acting aggressively against utilities that use sham parts, the NRC has flunked its own quality assessment test, stipulated by the Atomic Energy Act — to ensure that nuclear power plants do not endanger public health and safety.

MISSION STATEMENT

GARBAGE is independently published and has no ties to any political movement, industry, membership group, or activist organization. Furthermore, the editors endeavor to present topics of environmental concern from a journalistic perspective, rather than an advocacy perspective.

The mission of the magazine is. . .
. . . to follow in the tradition of a journal — looking to expert sources, providing depth of coverage, introducing the affiliations of all writers, offering analysis and perspective, and soliciting counterpoints.
. . . to predict and then research the important stories and controversies.
. . . to allow for skepticism (on all points of view), but with insight and a dose of humor.
. . . to allow science to speak, and allow policy to speak — and endeavor to explain which is which.

Finally, GARBAGE provides a forum where sometimes discordant groups — scientists, industry leaders, environmentalists, journalists, and public servants — may speak on the record before a diverse readership. Through presentation of a range of topics and opinions, the editors try to speak to the intrinsically human needs that gave rise to the modern environmental movement, while not ignoring science, while not discounting history, and while paying heed to risk assessment, prioritization, and economics.

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HADD, *noun* — Hikers Against Doo Doo, an international clearinghouse for information on the proper etiquette for depositing human (and domestic animal) excrement in the Big Outside.

Dr. A. Bern Hoff, a parasitologist, brainstormed HADD after sidestepping one stack of stool too many while hiking the Grand Canyon's Kaibob trail. His subsequent investigation into the health impacts of *Homo sapiens'* scat revealed that even in the most remote stretches of wilderness, backpackers cannot drink from seemingly crystal-clear streams without fear of contracting giardia, a disease spread through human and animal fecal deposits in or near running water. Other stomach-turning parasites, bacteria, and viruses have sent outdoor enthusiasts sprinting for secluded (and not so secluded) spots to relieve themselves. Left untreated, human scat degrades slowly. Even under the towering beauty of Mt. Everest, spring snowmelt in Nepal's Sagarmatha Park unveils a minefield of last summer's deposits, tufted with toilet paper. Fearing that hordes of hikers would render feces-free trails extinct, Dr. Hoff launched HADD in 1990 with the aim of collecting "vital information" on "environmentally safe destruction" of human feces.

"You'd think you'd learn [ecological depositing techniques] in the Boy Scouts or Girl Scouts," fumes HADD's publicist, L.L. Legume (a.k.a. Dr. Hoff). To correct the "sheer oblivion" of human offenders, HADD is launching informational programs and researching pooper-scooper ordinances to help other groups develop their own regulations. (Contact HADD at P.O. Box 271, Hampden, Maine 04444.)

And HADD is taking to the trails. At the base camp of Russia's Mt. Elbrus (18,437 feet), a chapter recently made plans to rebuild the outhouse, which *Outside* magazine dubbed "the world's nastiest." HADD's 1993 International Congress convened last July in Moscow's Hotel Rossia, where hundreds of attendees swapped ideas on how to keep the world's hiking trails devoid of human dingleberries. The motto for the 1994 conference (site yet to be determined): "Your movement is our movement!"